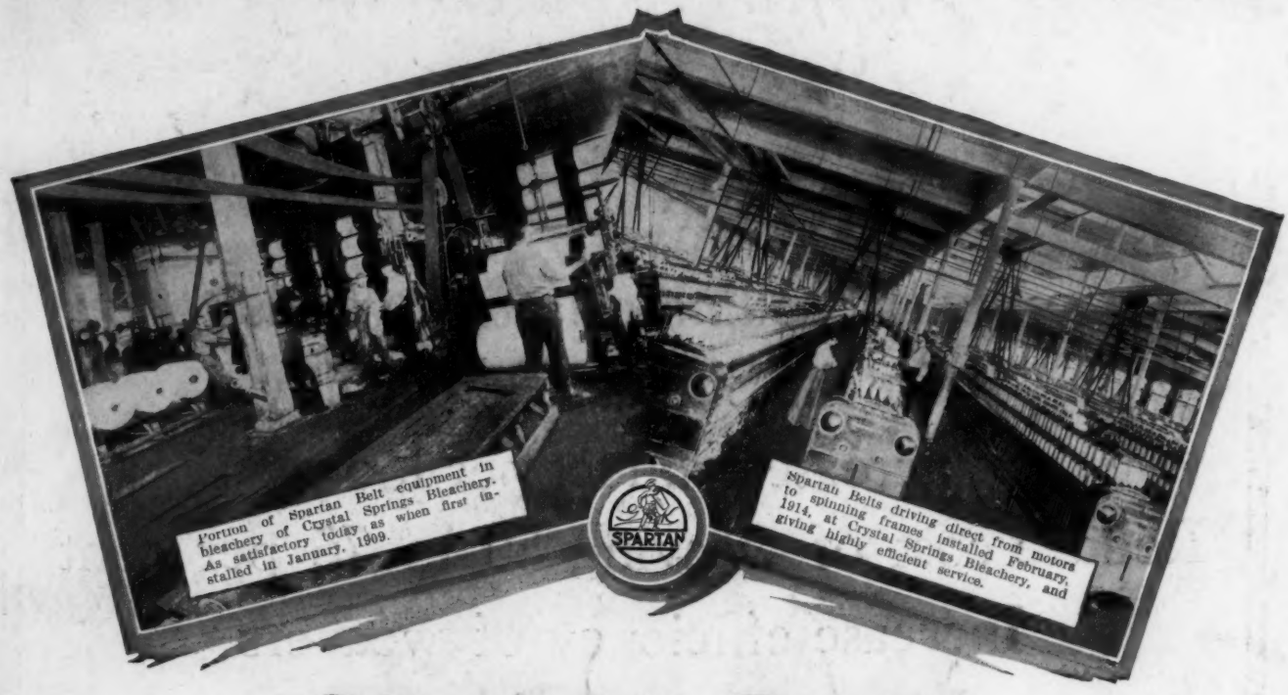
COTTON

Volume LXXX
Number Ten
Ten Cents a Copy

AUGUST, 1916

Published Monthly by
W. R. C. Smith Publishing Co.
Dalton, and Atlanta, Ga.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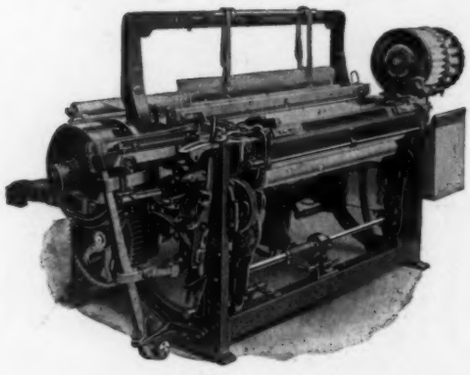

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Published Monthly by

W. R. C. Smith Publishing Co., Dalton and Atlanta, Ga.

L. L. ARNOLD, Editor.

Editorial and Advertising Departments Grant Building, Atlanta, Ga. Subscription price, $1.00 for two years; Canada, $1.00 a year; Foreign, $1.50 a year. Entered at the Dalton, Ga., postoffice as second-class matter.

Contributions to the columns of Cotton are solicited and paid for after publication. The names of contributors need not necessarily be used, but must accompany all manuscripts.

Orders for any change in advertising must reach Atlanta previous to the 10th of the month preceding month of issue, otherwise publishers cannot be responsible for changes.

When changing address, *notify us*, not the postmaster. Always give the old address as well as the new one.

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Volume 80. **Member Audit Bureau of Circulation.** **Number 10.**

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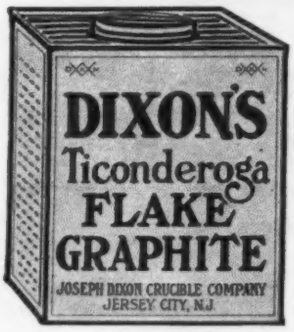

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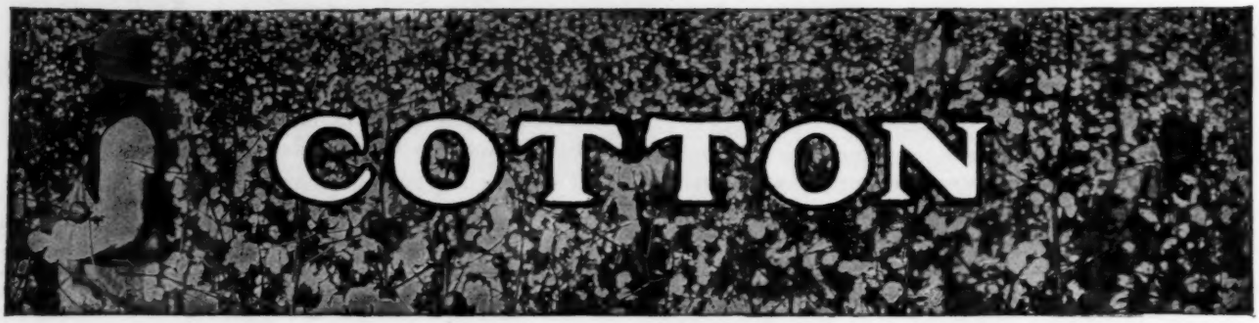


August, Nineteen-Sixteen.

It's the Little Things That Count.

This is a brief experience from the life of a trouble man.

The manager of a cotton mill was induced to discard his old carbon filament incandescent lamps and install the more up-to-date and less expensive Mazdas (that is, less expensive when looked at from an operating view point).

Like most mill managers, when a new device is adopted, this man was looking for trouble.

It goes without saying that he found it.

The filament breakage on the new Mazda lamps was extreme. So extreme that a claim was promptly made to the man who had induced the change, and a trouble man sent down to the mill to investigate.

Inquiry at the mill developed the information that not one solitary thing had been done since the installation of the new lamps that was in any way different from the routine methods adopted prior to their installation. Another peculiar circumstance about the breakage was that it did not seem to be uniform; that is, the breaks did not occur at places where there seemed to be undue jar where there might be reasons for these breaks, or in any other particular spot.

At lasf, the trouble man, who was not especially experienced in textile mill work, found a drop cord on one of the lamps that was covered with an accumulation of cotton lint. Noticing that the other cords were comparatively clean, he made inquiries concerning the reason for this and was immediately informed that the man whose duty it was to clean these cords had evidently missed the one bearing the lint. Further inquiry developed the fact that in order to clean these cords an ordinary corn broom was provided with an extension handle, and as the man walked along the floor of the room he cleaned the cords with the broom by pushing endwise with the broom on the cord, bearing it up toward the ceiling until it was dragged through the broom, whereupon the broom would be removed and the lamp would fall with a jerk and swing until it settled by gravity into its original position. It also developed that this work was done during the daylight hours when the lamps were not lighted.

The trouble man at once advised the manager that the filament of the Mazda lamps when cold is much more brittle than when lighted, and if he would have current turned on his lights during the time that the operative was cleaning these cords the suppleness of the filament due to the heat of the current, would prevent the breakage. This was done, and no more trouble experienced.

Watch for the little things.

The Making of Tariffs.

The railroads of the country, and particularly of some sections of the country, are strenuously advocating an increase in the amount of freight rates or tariffs. Some of the changes recommended are intended to be in the nature of a leveling or evening of rates, it is said, while others indicate a decided increase. Under the present greatly increased cost of operation it is only fair that the railroads should be allowed a suitable increase in proportion to the added expense, but, it would seem as if railroads might compensate the public for this attitude, and at the same time convince the skeptical, by simplifying and making intelligible to the layman the rates they now have.

Captain H. P. Meikleham discussed this subject from the cotton mill standpoint in the January, 1915, number of COTTON, and indicated by practical examples the utter inadequacy of the present tariffs and the absolute need of a high class "Traffic Manager" in order for the mill to obtain the proper and equitable rates. The *Traffic World*, in a recent issue is reminded in this connection of an article by George Fitch in Collier's Weekly, in the course of which, discussing the complexity of freight traffic problems, he said:

"When a citizen wishes to ship himself to another town he steps up to the ticket window and buys a small slip of pasteboard costing two or three cents a mile. But when he wants to ship a case of tomato catchup he goes to the station agent and asks for the rate. Then the station agent sends for the derrick crew and they lower a half ton book from the top of the safe, after which the agent looks up the rate on tomato catsup, without benzoate of soda, shipped in pint bottles with fancy labels in a pine box, unpainted, by a middle-aged man with medium whiswers, who owns an automobile and votes the progressive ticket. He finds this about an hour after supper time, and discovers that the tomato catsup, if packed by a brunette, takes the classification E in second zone, raised to the nth power and multiplied by the logarithm .9876—amounting to 23 cents. Thus it will be readily seen that a freight rate is no such simple thing as a passenger rate. Thousands of learned men are constantly busy planning and erecting new freight rates and classifications, and the science has now been perfected to a point where the ordinary citizen couldn't figure out the rate on a keg of nails for forty miles before the nails got stale. Undoubtedly the reason why the ancients did not have railroads was because the science of mathematics was not yet sufficiently perfected to produce freight rates. Freight rates are based partly upon

weight, partly upon distance, partly upon the amount of money the shipper has, and partly upon the parallax of Alpha Centauri. This makes their adjustment a very complicated problem."

Traffic World then adds to the suggestions that have already been made in the interest of simplification and intelligibility, that perhaps no one thing would be more efficacious than to have these tariffs—at least the more complicated ones—written by persons who understand the use of the English language. Tariffs that are already ponderously complicated because of their very nature under the methods of construction in vogue, are rendered still more difficult to understand by verbs without subjects, subjects without verbs, and pronouns with antecedents so uncertain as to approach the scandalous, the whole sprinkled generously and indiscriminately with meaningless punctuation marks, apparently used on the theory that there were plenty of them at hand and some of them ought to be used. These complexities and uncertainties not only mean annoyance to those who have to deal with them, but they are a source of positive financial loss.

A City for Tourists and Triflers.

The *Asheville Citizen* in its leading editorial on Monday morning, June 19th, attacks the Southern Textile Association with great bitterness and declares that it, "has not made a pleasant impression on this city." It justifies this attack because Vice-President J. M. Davis of Newberry, S. C., in an address on Child Labor Legislation at a meeting of this association on June 17th, saw fit to make some stinging but truthful statements concerning the adherents and promulgators of some of this so-called legislation. The *Citizen* characterizes this address as "worthy of the Bowery," but carefully avoids a discussion of the main point presented, viz., *a compulsory education law for children under 16 years of age.*

Asheville is a beautiful little city, but its development has been mainly due to the money spent by the tourists and the triflers. From the tone of the editorial in question, it is evident that cotton manufacturers are welcome to come and spend their money as tourists, but they must be careful to censor any remarks they may wish to make while in the city, so they will not grate on the peevish nerves of the triflers, as this class are proportionately the greater spenders. The timeliness of the article, coming as it were to speed the departing guest, is reminiscent of aristocratic poodles that remain in the seclusion of their kennels until the gates are shut and the danger of a parting kick has vanished, and then rush yapping to the fence in an effort to convince those who provide the bones that they are on the job.

Eleven New Members.

W. J. Vereen, the new president of the Cotton Manufacturers' Association of Georgia, is receiving hearty support in his efforts to enlarge and strengthen the association. Eleven additional mills enrolled as members during the month of June and others are yet to be heard from.

While it is entirely too early to make definite plans for the annual convention of this association next year, there is a movement on foot to extend the meeting dates to three days and hold the meeting at some popular shore resort, such as Cumberland Island, St. Simon's, or Tybee. This will allow the members to bring their families and will make the meeting a social as well as a business event.

Following are the official and committee appointments announced by President Vereen:

Vice-Presidents—R. C. Freeman, West Point; E. W. Swift, Columbus.

Auditing Committee—S. S. Evans, Chairman, Cedartown; J. H. Cheatham, Hartwell; P. F. Merritt, Greensboro.

Executive Committee—Allen F. Johnson, Chairman, Atlanta; C. B. Caperton, Trion; H. P. Meikleham, Lindale; G. B. Scott, Scottdale; D. A. Jewell, Chickamauga; Clyde L. King, Griffin; M. F. Cole, Newnan; W. T. Bryant, Athens; Fuller E. Callaway, LaGrange; W. H. Salmon, Chattahoochee.

Legislative Committee—F. B. Gordon, Chairman, Columbus; G. W. Hamilton, Dalton; Geo. H. Lanier, West Point; Jas. H. Porter, Macon; S. A. Carter, Atlanta; B. R. Blakely, Griffin; R. T. Jones, Canton; J. A. Mandeville, Carrollton; H. H. Tift, Tifton; L. F. Edwards, Crawford; C. V. Truitt, LaGrange; J. W. Parker, Pelham; J. W. Farmer, Fitzgerald; W. M. Harris, Hampton; C. E. McLin, Rome; T. J. Thornton, LaGrange.

Membership Committee—H. L. Williams, Chairman, Columbus; Garnett Andrews, Rossville; M. J. Daniel, Griffin.

Program Committee—W. C. Martin, Chairman, Egan; J. J. Scott, Decatur; Baynard Willingham, East Point.

Tariff Committee—Fuller E. Callaway, Chairman, LaGrange; F. B. Gordon, Columbus; Allen F. Johnson, Atlanta; H. P. Meikleham, Lindale; B. S. Walker, Griffin.

Traffic Committee—H. P. Meikleham, Chairman, Lindale; J. D. Massey, Columbus; W. H. Hightower, Thomaston; T. J. Callaway, Milstead.

Learning From Experience.

Learning from experience is said to be an expensive way to absorb knowledge, but knowledge so obtained usually has the advantage of being thorough and frequently becomes deeply rooted in the individual seedplot of the human mind. A somewhat easier and certainly a much less expensive method is to let the other fellow do the experimenting and be advised by his experiences. It is, however, only fair to add that this latter way is neither the popular nor the usual course.

An article on taking care of cranky customers, which appears in another part of this number, gives COTTON'S readers an opportunity to consider a question which is well worthy of serious thought. If the subject matter is studied carefully and the suggestions made given local application according to the needs and character of the individual business or customer, the results obtained may prove supprising, but satisfactory.

Weighting with tannin diminishes the affinity of silk for logwood. The state of oxidation in which the logwood exists also plays an important part in the matter, especially in the case of silk weighted with phosphate of tin.

The Cotton Goods Situation in China

BY ROBERT A. MORGAN.*

To any one who has made an observation of the trend of cotton goods in China during the last three decades the fact of mighty changes in this line will have undoubtedly been impressed upon him. The forces at work to bring about a change of style or pattern in wearing apparel might be easily traced, and definitely located, but the many subtle influences affecting the cotton goods trade in China is a subject for greater perusal.

Prior to the introduction of modern cotton manufacturing in China which may be said to date back some twenty-seven years, and by the way this may apply to Japan as well, the United States enjoyed a big proportion of the cotton goods trade of this country. This was especially felt in gray sheetings, shirtings, drills, and flannels, of the coarser grades. They won such favor that there is still a sale for them, though comparatively small, and in spite of the higher price at which they are held in comparison with domestic and Japanese goods. However it must be admitted that our trade in this line has continuously decreased year by year, and there seems no bright prospects of a reversal of form. The reason for this may be briefly summed up in the statement that China and Japan in their beginning of modern cotton manufacture naturally commenced with the coarser grades of cloth, that is, the same quality which was previously furnished by the American mills. Another reason was that of cotton grades. The cotton grown here being inferior to American in spinning quality.

Besides the advantage in locality, being in close proximity to the market to be supplied, thereby saving in cost of transportation; these countries have a tremendous advantage in labor costs. The conditions of life in the Orient is so different to that of the Western Hemisphere that it is impossible to compete on the same footing with these people. This has been a growing factor in textiles for this market. At first the inexperience of the operatives on power machinery and their unfamiliarity with foreign methods rendered them less efficient than their western brothers, but this condition is fast disappearing, and in Japan it might be considered as gone entirely. The fact remains that today the great bulk of the coarse cotton goods trade of China is in the hands of Japan and China, and their hold of this position is becoming more and more fast, so much so that the intelligent bidders for this trade in foreign lands have seen the necessity of changing over to finer goods in order to keep in the market. This is especially true of Manchester and the Lancashire district, they being the pioneers in introducing the finer grades into this section. while their position is such as to make them the controlling factor in supplying the best grades of cotton cloths in China, it is by no means satisfactory in view of the former prestige held by them in yarns, 32 and 36 inch sheetings. T-cloths and drills. The imports of bleached cloths and jeans have increased from Manchester but this does not counterbalance the decline in coarse goods, so that the total is showing a decided falling-off.

The cause for this situation is not hard to find. Japanese productions have steadily cut into the imports in the commoner classes of goods, in the meanwhile their influence is spreading into the higher grades with equal effectiveness as their activities develop in the cotton industry. Indian yarns have lost in volume at the hands of their cunning rivals, while English and American yarns have been practically forced out except the very fine counts. The Chinese mills as might be expected come in for a share of the capture of this trade, especially in yarns and ordinary plain cloths. And China is following the example of her enterprising neighbor in developing the cotton industry. Each year witnesses the founding of new cotton mills and additions to the already established ones. These new enlargements represent the very latest in machinery, methods and processes and the operatives are being educated up to the use of these improvements thereby increasing their efficiency as well as the quality of the mills product. The ring spinning frame has gained such a foothold as to practically replace the hand spinning wheel, and the power loom is fast making inroads into the domain of the hand loom. There are still numbers and numbers of old hand looms at work in all parts of China and perhaps will be for many a day. Many of them spinning their own yarn by hand, but an increasing majority are buying skein yarn from the power spinning mills. Many of the old mills are adding looms to their equipment which formerly consisted of few or no weaving machines. This with the fact that most of the new mills contain looms is evidence that the hand loom is steadily being relegated to the rear. So far no automatic looms are used in China, nor is there any demand for them. The great advantage of this type of loom, namely, its labor saving qualities, which has won for it such repute in America is a matter of no concern to the Chinese manufacturer. It is safe to say that many years will come and go before the Chinese seek the automatic loom. However there is a great field for the plain loom here which the American manufacturers of these machines should not overlook.

While the Chinese mills do not supply a large per cent of the cloth sold in this market as yet, they are producing around 700,000 bales per year of the yarn, with Japan delivering about the same amount. Furthermore business between America and China on sheeting, drills, and particularly jeans which at one time was in a flourishing state in which American mills successfully competed with the similar cloths made on hand looms from imported yarns has been almost driven out by the Japanese, and to a minor extent by the Chinese mills. With the exception of a short but glorious spurt given by the Russo-Japanese war, this trade in American plain staples has suffered a steady decline. The same is true of Manchester as is shown by the following table supplied by a Shanghai representative of one of Manchester's firms, covering the last three decades:

	1885-1894	1895-1904	1905-1914
Gray Shirting.....	54,138,064	45,811,032	33,887,974
T-Cloths, 32" & 36"....	15,384,300	7,653,823	5,387,447
Bleached Goods	17,621,139	18,894,193	27,099,840
Drills & Sheeting	9,364,394	8,364,500	2,925,526
Jeans	1,373,006	1,531,896	8,095,960
Total	97,944,903	82,255,453	77,396,747

*Superintendent of the Heng Foong Cotton Mfg. Co., Shanghai.

From this it will be seen that while bleached goods and jeans have made some advance the other classes have decidedly fallen off until a comparison of the last decade with the first shows a loss of 20,400,000 pieces of lengths varying between 30 and 40 yards, or a decrease of 21 per cent.

Muslins is a term which means quite a different thing in China to what it commonly implies in the States. Here it embraces all that class of dress goods whose color and designs are stamped or printed on the cloth, as embodied in the terms calico, print shirtings, etc., in American parlance. This class of goods comprise an important division of the cotton imports of China. It is the chief material for the summer dress of the vast majority of Chinese women and children. German houses in China have always done a large business in this line undoubtedly because they have been more persistent in solicitation, and have given the careful attention due the great amount of detail connected with this line. A complex variety of designs and figures are pleasing to the Chinese eye and colors quite unbecoming the western attire are popular here. The rivalry between the German and English in this market has lowered the standard of quality until a worthy competitor namely, the Russian printer has entered the field and offered a superior commodity with the result that a good proportion of the trade has been lost to the older claimants. This business which started by direct sampling through Chinese hands in Northern Manchuria on a branch of the Siberian Railway, has spread through the interior of China. This method of distribution has been very satisfactory as it has many points in its favor, but objections might be raised in the fact that new goods will not be pushed so much by Chinese as by foreign representatives.

The difficulty of direct dealing with the customers in the interior lies in the lack of a standardized currency. This constitutes a severe handicap to the prospective trader, while the system of credit between native dealers involving a different set of customs for nearly every commodity and every place make it almost imperative that this be handled by the natives themselves. Formerly this trade was carried on largely through the medium of a chain of native banks which had a firm footing because of the immense revenues which passed between the different provinces and through their hands to the Central Government at Peking. The first revolution of 1911, however, put an end to these banks when the monarchy was overthrown. The funds from these institutions were gathered together and removed to the foreign banks in treaty ports or invested in foreign securities so that practically all financial facilities were taken from the routes of trade and at the time of writing no adequate means has been substituted. But trade must go on and so large and industrious a population must be duly considered. No doubt some way will be found to overcome this financial disability and the country placed on sound footing in the matter of trade.

The Chinese banking system is the oldest in the world, and the most primitive. The official unit of the national currency, namely, the tael, does not exist; or if it does exist it is only in imagination. The tael is not a coin, but a unit of weight, hence for the intercourse of trade some other system of currency must be had, so it becomes that the Mexican dollar is the common medium of exchange in China. This however varies in value from day to day and in different places. As a result there are innumerable exchange banks existing from the profits of exchanging money, a purely speculative proposition. For instance, suppose a mill had an account with a Chinese merchant for $1,000 U. S. currency, he will doubtless have his account at the bank in terms of taels, then to pay the mill the equivalent of its account in local currency, he will have to convert the U. S., commonly called gold, dollars into taels, and then from taels into Mexican dollars. The banks charge a different rate for buying and selling gold so it often happens that the mill will be the loser in the transaction. The chance of gain and the uncertainty of the valuation seems to appeal to the average Chinese and the many exchange banks deriving a revenue from the system combine to keep a system in vogue which has little or nothing to commend it to us. The new republic has coined an official silver dollar of the same valuation as the Mexican, but it depreciated on account of the unstable political situation and even the natives discount it in payment of bills.

In close connection with the currency situation the financial position of China is a tell-tale symbol of its present impoverished state. The average adverse balance of trade against China for the last ten years has been a no less item than 140 million taels per annum. This is equivalent to about 85 million dollars U. S. currency and is a matter of serious concern to the government of this large and increasing foreign buying population. To this must be added interest and redemption payments against external loans amounting to Tls. 70,000,000 making the total annual debit Tls. 210,000,000. Some of this is for loans invested in industrial and railway development, but a large part, the interest on Tls. 450,000,000 amounting to Tls. 20,000,000 annually, is for indemnity which the country has to pay for her indulgencies in the Boxer trouble of 1900. China has already pledged about all of its available securities to foreign powers, so that it will be necessary to develop more industries to enhance the borrowing power. Much of the money obtained from the money markets of other lands goes to the upkeep of the army, another course is to high officials in the form of salary.

China has a great power of absorbing imports. The 400 millions of population must be clothed and their demand for the better grades in cotton goods is growing steadily. True this is the home of the silk industry, but even here it is confined to the higher classes, so that the cotton cloth trade is large. Also it must be remembered that woolen goods form a very small per cent of the Chinese attire, so silk and cotton constitute the bulk. It is a fortunate characteristic of human nature that the poor imitate the rich in dress, for the use of mercerized poplins and sateens and Italians in the dress of the lower classes of Chinese clothing has opened a big field of trade in these lines.

In conclusion, the textile trade in China presents the fact that unlimited possibilities lie in this market for the foreign exporter, and America should logically come in for a large share of this trade. The United States has one large asset that is often overlooked, or slightly considered, by the traders, that is its potential wealth of good favor. No other country is so well and so favorably represented in missionaries. These good people enter into the very heart of China and besides carrying the word of God, act as emmissaries to American commerce as well. It should be an easy matter to gain a large share of trade with the

aid of this active force at work in our interests. But radical changes must come about in China's administration of the government before trade will receive the fostering protection it needs. There is a transition in political affairs at present and it is to be hoped that permanent good will result. The study of the situation discloses that Japan has actively participated and has ambitions in this direction, and she will have to be dealt with. However, these efforts seem to be more along the line of established routes rather than introducing new. America asks for no special privileges, but does insist upon the retention of "The Open Door."

American traders have worthy examples in their fellow countrymen to emulate in the representations of The Standard Oil Company and the British-American Tobacco Company as well as numerous other smaller concerns which have entered this field and displayed the ability of American business men to successfully meet all competitors on equal footing. The Chinese merchant has great admiration for the American business methods and exceeding confidence in the honor of its representatives, so there only remains the matter of presentation to unite the two great republics of the east and west in commerce.

Obstructions on the Road to Efficiency.

BY A. M. OLIVER.

There are many objections offered from time to time where scientific management is in the process of introduction. H. L. Gantt says that before you can gain the confidence of the entire plant you must have at least 25 per cent of the operatives on bonus. The objections offered vary greatly both in form and origin, but the greatest objection of all can usually be traced to the overseer or man in charge of the department in which the efficiency engineer is working. I don't mean by this that every overseer or foreman offers objections, but I do mean that about 70 per cent of the overseers and foremen dislike to see any changes made and will hinder rather than help to put them through.

The reason for the objections offered by these men is very seldom stated, but they need no explaining and immediately begin to "stick out" all over. Of course the man in charge of the department has pledged himself to assist the efficiency engineer, and for that reason it becomes necessary that he extend some amount of courtesy. He will not put himself out of his way to help very much, but will answer, as briefly as possible, any question the engineer sees fit to ask. Now what is the real reason for this feeling toward the efficiency man? Is it because he is considered a sneak? Is it because he has a stop-watch? Or is it because the overseer is afraid there will be some change made that will affect him?

I have proved to my own satisfaction just why this feeling is so prominent and just why an overseer or man in charge of a department dislikes to see an efficiency man in the department. I have studied the different types of foremen and overseers and, with very few exceptions, find that they are all alike in this particular fault. They have been taught to do their job *one* way and they think there is no better way. Not because they are dull or lack the brains, but simply because they don't want to have anybody tell them *how* they should do their work to obtain the greatest amount of efficiency. They were left in charge of a department and they were given a few instructions as to what was expected of them. Detail instructions were omitted and because of that omission they have taken the privilege to extend their authority far beyond the limit that the superintendent intended. They have allowed men to be out and not lose their pay. They have sent men to their homes to do various jobs and charged the time to the company. I have even known an overseer to go so far as to allow a man his time while beating rugs and also give him an additional five hours pay. This was entered on the pay-roll as overtime. Clerks have been allowed to be out and receive full pay; men who were late were not docked, and if a man asked out for an hour or two he was allowed to go on the company's time.

Overseers dislike to have the privilege of adding to and subtracting from the pay-roll taken from them. They dislike to be deprived of the right to change a man's hourly rate whenever they take a notion; they dislike to feel that they are unable to allow an operative 100 or 200 pieces because he went out on an errand and was gone two hours. In other words, they dislike to have some one from the outside come into their department and show up the conditions just as they exist. This is the whole sum and substance of the objection that an overseer or foreman offers to scientific management and it cannot be explained any other way.

With a scientific timekeeping system, the overseer must pay some one to clean his carpets, he must pay to have his lawn mowed and he must pay an operative a wage equivalent to the hours worked at a specified rate per hour. He cannot make a good fellow of himself and he cannot hire all his friends. He is given an "Estimate Sheet" which tells him how many hands he is allowed on each job. He cannot change rates and he can add nothing to a man's pay. This is all taken out of his hands and he must run his department as instructed. This is the part that hurts him and the more I go from one plant to another the more pronounced this fact becomes.

An overseer doesn't dislike an efficiency engineer just because he *is* an efficiency engineer, but simply because he knows it is only a matter of time when he will be asked to explain why this is and that exists and when conditions have been made right he knows that he will be obliged to run his department to the best possible advantage and for the interests of his employers, rather than with the idea of making a good fellow of himself with the feeling that the company can stand it.

About the severest test to which any wood finish has ever been subjected was recently sustained by the finish known as Wolf's elastine lacquer, manufactured by the Leon L. Wolf Paint Company, 314 Lincoln Inn Court, Cincinnati, Ohio. The test was made by the Cincinnati, Hamilton & Dayton Railroad Company, at Cincinnati. A panel, varnished with Elastine lacquer, was exposed to a steam jet from a locomotive fifteen minutes, after which it was immersed in ice water. It was then dipped into a tank of boiling lye water, and then placed in a tank filled with muriatic acid. It was washed in plain water after these trials, and came out of all these extraordinary tests with no damage whatever. The company are demonstrating their product by sending free samples to those who wish to examine it.

Cost of a Concrete Building.

In a recent address before the Real Estate Exchange of Cincinnati, W. P. Anderson, president of The Ferro Concrete Construction Co., of that city, gave some interesting figures on the costs of reinforced concrete buildings. While he realized that a good many items included in the cost of such buildings will naturally vary, he takes as a basis a plain structure, with no fancy exterior decorations, and includes the principal items which go to make up the cost, such as, walls, windows, floors, floor finish, stairs, toilets and plumbing fixtures. The cost of excavation, heating, lighting and elevators is so dependent upon each particular building that these items are omitted from the estimate.

The assumed load on the floors is 150 pounds per square foot with column spacing about 18 feet on centers and story heights about 12 feet. Mr. Anderson estimates that the base cost on a building 50 by 50 feet as about $1.55 per square foot of floor space. If the building is 50 by 100 feet, this price would be reduced to $1.20. If 50 by 150 feet, it would be $1.12, and if 50 by 200 feet, it would be $1.07. In all these cases the building is assumed to be from four to ten stories high. A three-story building would cost somewhat more, but the difference would be very slight. A two-story building would cost from 10 to 12 per cent more than these figures, and a one-story building from 15 to 20 per cent more. A decrease in the width of the building would increase the cost so that for a width of 25 feet instead of 50 feet the unit cost would be increased from 35 to 45 per cent. If, however, buildings' widths are increased costs would be correspondingly decreased.

The effect of increasing or decreasing the floor load depends on the height of the building. Obviously, there would be practically no change on a one-story building, as the load comes directly on the ground. In a six-story building the decrease in cost for a 75-pound load would be about 12 cents per square foot of floor space. This figure would also about equal the increase in cost if the live load was doubled.

The effect on the cost of varying the column spacing will not be great. Where columns are spaced about 15 feet apart the cost will be about 6 per cent greater than where columns are spaced 25 feet apart both ways.

In giving these estimates of costs for reinforced concrete buildings Mr. Anderson allowed two stairways and one elevator tower for a building under 150 feet in length and two stairways and two elevator towers for greater lengths. Two plumbing fixtures per floor were allowed for the first 5000 square feet and one additional fixture for each additional 5000 square feet. No allowance was made for any interior partition work except that which would be necessary around stairs, elevator shafts and toilets. Of course, these estimates are based on plain factory buildings, and any attempt at decoration would increase the cost.

The percentage of window area to wall area would have but little effect on the unit cost of the building. In figuring the estimates given a steel sash window with ordinary glass was used. If wire glass was found necessary the cost would be a little more than for plain wall, but the increase in the factor of fire safety usually makes such use advisable.

Danger in the Use of Ladders.

Many people fail to realize the danger connected with the use of ladders. Many accidents are caused by the use of poorly constructed ladders, the work of making them being entrusted to men who are unskilled in making ladders. Ladders should be well constructed and kept in perfect repair. The size of the rails should be in proportion to the length; they should be made of straight-grained Norway pine, Oregon pine, spruce or yellow pine, and kept free from splinters. The rungs should be made of white ash, oak, or hickory, using pieces of straight-grained stock, split to size (not sawed pieces) before finishing; for ladders of ordinary width, the rungs should be not less than 1⅛-inch diameter, tenoned at ends to fit ⅞-inch holes in the rails, and the rails tied together every six feet with tie rods; for wide ladders the rungs must be proportionately heavier. The practice of fastening flat rungs on the front sides of the rails by means of nails, screws, bolts and clamps is condemned, as the fastenings will rust or work loose or the rungs will split or break and may cause a fall.

All portable ladders should be equipped with devices to prevent slipping. On soft floors, the ladder should be fitted with spiked feet (rubber ends not good for oily or hot floors), or other non slipping shoes. On metal or concrete floors, a shoe faced with carborundum or other form of abrasive should be attached; there are a number of such shoes now manufactured which can easily be fastened to the ordinary ladder. For ladders used in connection with shafting, as for oiling, repair work, etc, hooks should be secured to the ladder rails at the top as a further safeguard against slipping.

Stationary ladders should be made of steel and set out at least eight inches from the wall, column, or other object, so as to give proper foothold at all the rungs. If practical, the ladder should not be over 20 feet in length, without a break or landing platform. For ladders greater than 20 feet in length, a safety cage should be provided. The uprights should be made of 2½-inch by ⅜-inch flat and extended at least 3½ feet above the landing. The rungs should be made of ¾-inch round with the ends turned down to ⅝ inch and then riveted over or else the ends threaded and a nut placed on both sides of the uprights. Ladders of this type should be well made and firmly supported in order to withstand the abuse of trucking and moving of material.

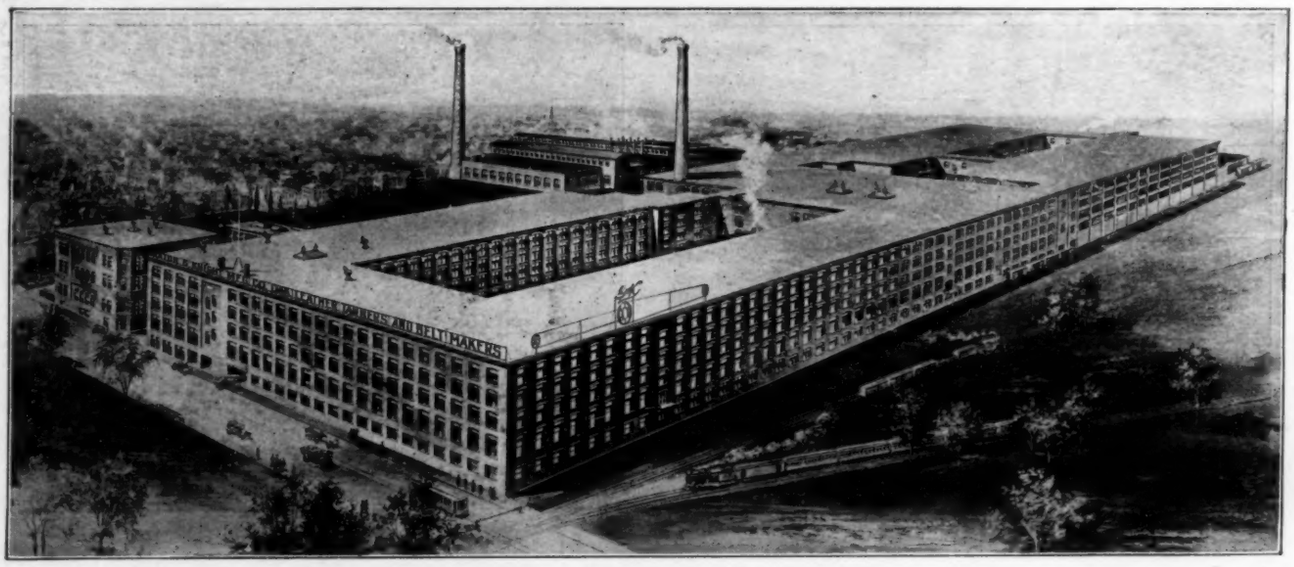
Wherever possible, stairs should be used instead of ladders; care should be taken to make them as safe as possible. They should not be set at an angle greater than 50 degrees, but if this is impractical, a ladder should be used instead.—The Dodge Idea.

The Paramount Hosiery Form Drying Co., Hunter Building, Market and Madison Sts., Chicago, have increased their capital stock from $40,000 to $100,000. Henry Pope, president of the Paramount Knitting Co., will devote his whole time to the Paramount Hosiery Form Drying Co., and W. E. Clark has been appointed General Manager of the Paramount Knitting Co. The business of the metal form Company is growing so rapidly that it requires the entire attention of Mr. Pope.

A Modern Belting Factory

It was about a year and a half ago that the management of The Graton & Knight Mfg. Co. chose to start work on the largest addition that they had ever made to their already extensive plant. The fall of 1914 was a rather unpromising time to build, for business conditions were at a very low ebb. It was decided to erect concrete buildings, however and these additions are already stocked from floor to ceiling. The scene of activity everywhere, shows as nothing else could, the foresight of those who control the affairs of the concern, and justifes their faith in the future prospects of business.

The growth of Graton & Knight has been neither spasmodic nor by leaps and bounds, but ever steady and healthy from its modest beginning sixty-five years ago. The various stages of this growth are well represented by the additions that have been made to the plant from time to time. Twenty buildings now constitute the Worcester plant of the company, but these are so joined together that the aggregate represents one building of enormous dimensions, having over half a million square feet of floor space.



THE GRATON & KNIGHT PLANT TODAY.

The two latest additions, known as buildings "D" and "E" represent a specimen of what is best and most modern in the concrete type of construction, with a total floor area of about 110,000 square feet. The erection of these buildings made it possible for the management of the concern to install some improvements which they had been developing and also enables them to increase their production when business warrants. The paramount thought in planning the buildings was cleanliness, durability and efficiency throughout. The result is that the equipment and arrangement of the various departments represent the best that engineers could conceive—for knowing the requirements of the various processes, the buildings were built to fit these processes.

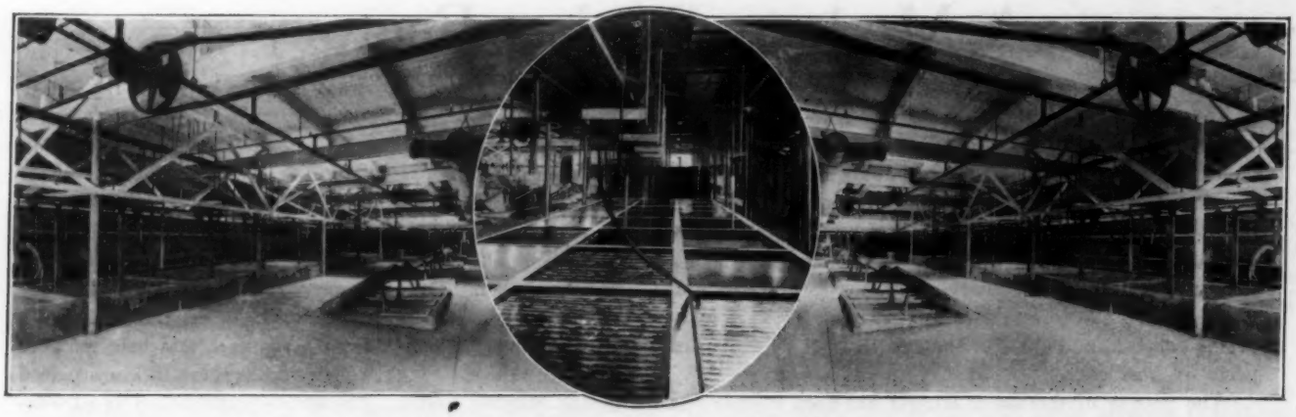
The first floor of building "D," commonly called the new "beam house," is 225 feet long and 115 feet wide, doubling the capacity for preparing the hides for the initial stages of tanning. The construction of the soak vats, wheel and agitator pits with their attendant system of drains and sewers presented an interesting problem as this necessitated the excavation of several thousand cubic yards of earth and ledge, mostly the latter. The arrangement throughout has been to keep the hides moving in one continuous direction from the moment they are brought to the "beam house" from the connecting "hide cellar." The hides are thoroughly cleaned, soaked, the flesh and hair removed and then sent along to the "tan yard" where they are placed in the tanning liquid. The entire construction is of concrete and steel, concrete floors and walls, vats and pits, and all has been done that possibly could be done for the convenience and comfort of the workmen.

The three floors above the "beam house" are 225 feet long and 70 feet wide. The second floor is used as one of the "setting out" rooms, and the hides are brought here on a belt conveyor, are washed, bleached, split, oiled and smoothed, or "set out" by the latest type of machinery to be obtained. They are then conveyed to the "stretching room" located on the floor above. The fourth floor of the building is used by the "lace leather department." Much of the machinery used here is of special construction, and was made and designed by the company and is not found elsewhere.

Building "E" is 225 feet long, 65 feet wide, and is four stories high. The first floor is used for storing hides, and is commonly called the "hide cellar," where provision has been made for storing an enormous quantity of hides. The company buys nearly all its annual requirements of hides in the summer months, when it is possible to obtain the best hides for belting purposes, and stores these here until needed. On the second floor of this building is located the "electrical department" and the extensive "supply room" maintained by this concern.

The third floor is used as a general maintenance depart-

By courtesy of the Worcester Magazine.



Interior of Beam House—Soak Vats in Center.

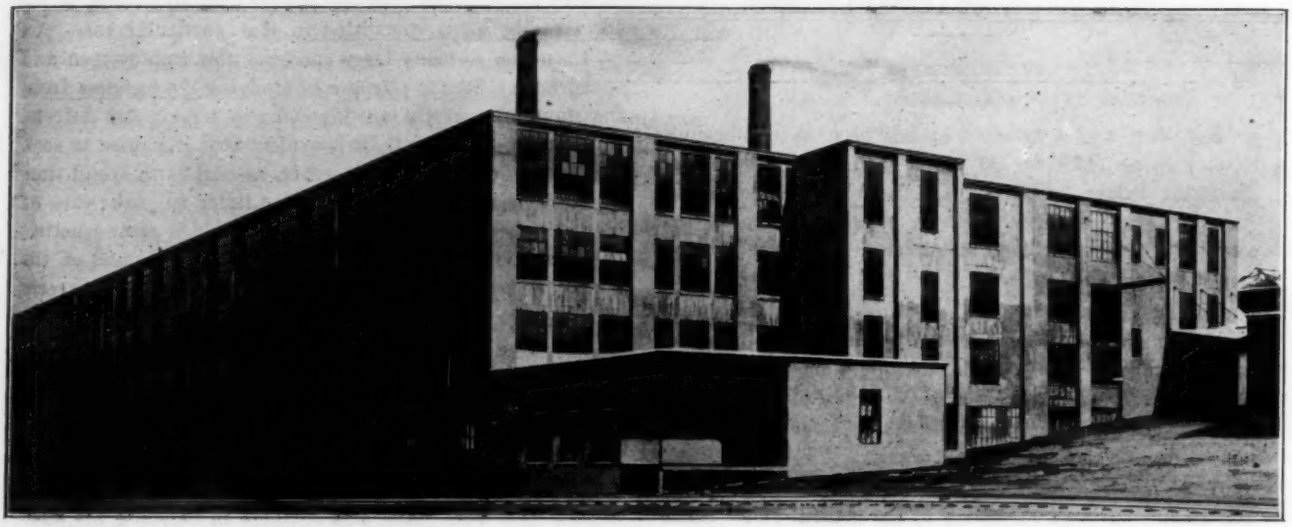
ment with carpenter, machine and pipe fitting shops. On the top floor is one of the fitting and stock rooms. Here the belting strips are sorted and matched to insure uniform quality and thickness for each respective brand. Here also is maintained continually an extensive stock of finished leather. From the ceiling provision has been made to hang several thousand "shoulders" at one time.

Besides buildings "D" and "E" the company has within the last year built several smaller buildings. A completely new heating and power plant was erected with the latest equipment, including four Babcock & Wilcox boilers of 300 h. p. each, Webster automatic coal conveyor and weighers, Sanford-Riley stokers, and a Brown Hoisting Machine Company's bunker of 600 tons capacity. All coal used is grav-

Hide Cellar.

Lace Leather Department.

One of the Fitting and Stock Rooms.



LATEST ADDITIONS TO PLANT OF THE GRATON & KNIGHT MFG. CO.

ity-fed into a crusher, then hoisted to the bunker, automatically weighed and distributed by chutes to the stokers. The ashes are removed by a compressed air ash ejector connected to a large tank outside. Another and quite essential item of equipment for this power plant, is a new chimney 150 feet in height, built of radial brick by The Custodis Chimney Construction Company.

In the erection of the new buildings considerable thought was given to obtain conditions that will prove effective in caring for the health and comfort of the workmen. Buildings "D" and "E" are both heated by a direct engine-driven Sturtevant multivane blower and vento-heater. This system is so arranged that recirculation of entire fresh air or any combination of the two may be used. The buildings although of fire proof construction have been equipped throughout with a sprinkler system, and there are innumerable fire doors, staircases, and fire extinguishers in all parts of the buildings; the plant, from a fire insurance man's point of view, presents one of the best protected plants in the country. Plenty of light has been provided in all departments, as over forty per cent. of the total wall area is of glass.

It must have been with a feeling of pride and satisfaction that Mr. Graton, the only living member of the original partnership, watched the erection of these buildings. It was in 1847 that he and Mr. Knight went to Worcester and secured employment with a card clothing concern which later added a belt shop. Here they worked at the benches constructing leather belts until they had acquired knowledge, confidence and savings to warrant the purchase of the belt business. With a capital of about $800 they began the manufacture of leather belting in two rooms, one of which, scarcely twenty feet by sixty feet, was used as a workshop. With that self-reliance, courage and persistence so characteristic of the early founders of large industries, the two pioneer belt makers, who for some time comprised the entire labor and administrative force of the company, curried the rough tanned hides and cut them into belt strips which they riveted or laced into belting. In 1867 they opened their first tannery with a capacity of a few hundred hides a year, and in 1872 formed a corporation with a capital of $100,000. Today, The Graton & Knight Mfg. Co. has a capital of $2,000,000 and the largest plant of its type in the world, in which over 250,000 hides are annually tanned and manufactured into leather belting and hundreds of leather specialties, giving employment to more than 1,800 persons and having 19 branches in this country and England, with branch factories in Cleveland and Detroit.

Raw Materials Advance in Price.

Raw materials used in making fibre are largely imported from foreign sources under normal conditions; and, unfortunately, some of the items are unobtainable from domestic sources even in quantities necessary for normal production in normal times. Now that abnormal demands are being made for all of the elements used, as well as for finished products, and the abnormal conditions abroad make it almost impossible to obtain materials at all, the prices for raw materials are showing a very sharp tendency upward, as the following list will show: Cotton rags 500 per cent, lamp black 50 per cent, bleach 1200 per cent, aniline color 5000 per cent, soda ash 400 per cent, alum 800 per cent, mineral colors 50 per cent, chloride of zinc 150 per cent and coal 60 per cent.

Through the great amount of publicity given the subject in daily and trade press, everybody is familiar with the dye and the chemical situations. In addition to this is an additional handicap in the rag market. It takes two pounds of cotton rags to make one pound of fibre. At present almost no imports are possible. Germany, a large exporter of rags, placed an embargo on their exportation some time ago. February 1, 1915, an embargo was placed on English rags. Italy does not allow rags to leave her ports at any time. Holland is the only exporting country which is able to furnish a suitable grade and there are almost unsurmountable difficulties in getting those she offers to the world. Domestic rags are being purchased by powder makers at a great premium for use in making gun cotton. The large demand for rags in this country is almost sure to lead to a shortage.

These facts have recently been set forth in a bulletin by the Diamond State Fibre Co., Elsmere, Del., and would seem to indicate that consumers of fibre goods who have already placed orders are among the fortunate class.

Taking Care of the Cranky Customer.

BY "EXPERIENCE."

Not long ago a tailor, who has been in the business of cutting up cloth for 30 years, sighed as he looked up from his ledger, where he had been running over the lessening accounts of his former regular customers, and said, "Pretty soon we'll have left only the business of the cripples and the cranks."

The admission of the made-to-measure man that a great many people were able to get along without his individual service contains a suggestion that may be applicable to other fields. Few are seeking the trade of the business "cripples;" on the other hand, there may be some advantage in looking into the status of the cranks. What about them?

There are cranks in nearly every business, and cotton manufacturing is no exception to the general rule. Sometimes the crank is that way by nature, and can't help impressing those who deal with him with the fact that his grouch is in good working order. Then there are others who are frequently labeled "cranks" merely because their methods are *nice*, using that much-abused word in its most restricted sense. That sort of crank has a justification for his crankiness, for the general tendency in business is to do things "the easiest way." The man who makes a special effort to get things "just so," no matter how long it takes, is usually put down as a crank. And because he doesn't make the speed some others do, he is classed with the mental cripples, whereas he is merely a bit more particular than the average run of folks.

Of course, in this day when 100 per cent. is the goal of every efficiency man, and when even 99.44 doesent seem quite satisfactory, the man who is careful, but slow, doesn't get the applause that he once did. The heroes of the success stories of the last generation, by Horatio Alger, Jr., and the rest of his school, were always careful, substantial, even slow. Nowadays the requirements of success are snap, speed and dash. Accuracy is wanted, but rapidity of movement comes first. Perhaps a system of that kind wears out the human machine a little faster than the old one—but then, look how much more of life can be compressed into a few years than was possible away back in the nineteenth century.

But getting back to the subject of cranks and crankiness, as they affect the business of the textile manufacturer, it is not always well to decide that just because So-and-So is in the habit of complaining, he is an undesirable man to have on the books. Of course, nobody likes to have complaints; it is rather irritating to have to spend time in settling them, usually a profitless and disagreeable task. It is much nicer to have the business closed up without any kicks, and to assume that all of the goods being shipped out are "hunky-dory" and that every customer is satisfied.

As a matter of fact, however, it is unlikely in this world of care and trouble that any business, no matter how carefully run, is going to escape errors and the cranks are useful if for no other reason than that they call attention to the mistakes. Some buyers, who are just as exacting in their demands, are not cranky; but when the manufacturer makes a mistake, whether of commission or of omission, they promptly decide to do business elsewhere, so that the concern is not given even the opportunity to reform in respect to the error committed in that particular case.

Inasmuch as many large concerns now employ men and spend money for the purpose of studying the business from the standpoint of the outsider who is looking for defects, rather than good points, it is evident that it is wise to seek the flaws in the business structure, as well as to spend time in admiring the strong points. The latter will take care of themselves; but it is the other things which escape notice, and may go right on killing business unless some of the cranks insist on calling them to the attention of the concern.

Not every one can afford to have an efficiency man around all the time going over the plant, watching the methods used in manufacturing, packing and shipping the goods, and looking over the shoulder of the bookkeeper who figures out the charges and the credits. Hence if the occasional cranky customer is able to get the attention of the head of the house by rising up and storming because errors were made here or there in handling his business, he is really doing the manufacturer a favor, and is deserving of thanks, provided, always, that the "kick" is based on a legitimate proposition.

Of course, there are some who are placed in the "crank" category who are merely "kickers," and who "kick" on general principles, irrespective of the correctness of the complaint. There are office men, for instance, who measure their value to their employers by the amounts they can get "knocked off" the invoices of those from whom they buy. These are the petty larcenists of business. And of course there are those who "kick" because they like it, and those who "kick" for the reason which actuates a certain type of baseball player. He "beefs" with the umpire, not because that dignitary has necessarily made a mistake, but to impress him with the danger of giving the other side the "breaks" on the "close ones."

Again, there is the man who labors under the impression that he is one of the few honest men in the world, and who suspects the other fellow of always trying to put something over. Even in the cotton manufacturing business, it pays to assume that those with whom you deal are endeavoring to give you an "even break," until it is demonstrated that such is not the case. Doing business on this basis will, at least, make for a more pleasant atmosphere in the office, whereas the necessity of maintaining a continual attitude of suspicion is somewhat hard on the disposition. In other words, don't be a crank in your own buying!

But, assuming that the so-called crank has merit in his complaint, and that "somebody blundered" in taking care of his business, the thing to do is not merely to adjust the proposition, as far as that transaction is concerned, but to study the question so that the whole machinery of the business can be arranged to eliminate the error thereafter. Experience is the best possible teacher, and complaints, unpleasant as they frequently are, form the most valuable part of the business man's book of experience. It is poor policy to throw this into the discard, or to file it away where it will never be seen again; in short, to "forget it," as the average man likes to do regarding the unpleasant features of his business. It is much more profitable in the long run to take the complaint apart, look over its component details, and determine whether or not there is likelihood, under the circumstances, of this particular mistake being made again.

Most successful businesses look to the outsider just like any other of the same kind. The writer has in mind a commission house which failed for a quarter of a million not long ago; to him, and to many others (including several shrewd bankers), this house looked like Success, with a capital letter, and on that basis it was able to get practically unlimited credit. When the crash came it was found to have been putting up a most impressive front, but to have little back of it except cool determination, some juggled statements and a few little things like that. The banks had been hypnotized into taking the appearance for the real thing.

The manufacturer who is trying to build a success should realize, therefore, that this will consist not merely in "putting up a front" or in maintaining a big organization. These are fine if they happen to be appropriate to the business, but are not essential to a successful enterprise. It is the little things pertaining to the service given the customer that count, and hence seeing that the service is maintained is a good deal more important, in the long run, than merely providing the atmosphere and the stage properties of an apparently successful establishment.

And right here it should be remembered that one of the most important things about the cranky customer is that he is often made cranky by the peculiarities of his own customers. That is, cotton goods are usually bought to be sold again, in one form or another. The buyer often learns about the poor quality or at least the uneven quality of the goods he buys by the comments of his own patrons, and he is acting as a transmitter for them to speak through when he voices those complaints to you. When you receive a "kick," therefore, it is not merely one buyer speaking, but perhaps many, depending on the size of the customer's business. While it might be practicable to treat a single concern without much consideration, if the complaint appeared to be unreasonable, the fact that the customer is standing in front of several hundred thousand "ultimate consumers," who, in the end must be satisfied if your business is to remain on a permanently profitable basis, puts an entirely different face on the proposition.

Each complaint, it goes without saying, should be handled on its merits, sifted to the bottom and settled as satisfactorily to both parties at interest as the facts will allow. Because a man has a repuation for being a "kicker," therefore, don't assume that his kicks are always without reason. Perhaps he is just enough smarter than his competitors to be able to determine when he isn't getting full measure in quality and quantity. Perhaps he has discovered something in *your* business that *you ought to know*. Perhaps he is doing you a favor in kicking at all!

Besides, the cranky customer, if he is cranky because he thinks he has reason to be, is going to respond to the sort of treatment which careful consideration of every complaint will insure. He is going to be made to feel that he isn't regarded as a crank, but as a friend of the house. And he is going to be made glad by the friendly, businesslike way in which every "kick," no matter how inconsequential, is taken up and disposed of.

The house or factory which can satisfy "the cripples and the cranks" ought to be good enough for anybody. If you can make pleased customers of those whom others pass up as confirmed cranks, you are assured of satisfying those whom anybody can please. And the cranks, as a whole, are numerous and important enough to justify special attention.

Latin American Monetary Systems.

BY JOSEPH T. COSBY.*

NICARAGUA.

The present monetary system of Nicaragua is the gold standard. The unit is the cordoba, divided into 100 centavos. The weight of the theoretical gold unit is 1.6718 grammes of gold .900 fine, or say 1.50464 grammes of fine gold, and its value in terms of U. S. currency is $1.00. The circulation consists of silver coin and bank notes guaranteed to be payable in gold.

Until three years ago, the monetary unit of Nicaragua was the silver peso with a nominal value of $0.435 in terms of U. S. currency. The actual currency, however, was inconvertible paper, and the exchange rates ranged from 1000 to 1700 per cent premium for sight bills on New York.

Some three years ago, certain New York interests, through the medium of the Banco Nacional de Nicaragua, Inc., undertook to rehabilitate the finances of Nicaragua, and as a result the present monetary system was established. Under this system the old paper peso circulation is being retired at a fixed rate of $12.50 pesos per one cordoba.

Since the outbreak of the war, financial conditions in Nicaragua have become acute. During the first month of the war, foreign remittances were impossible to secure, save through the medium of the Banco Nacional de Nicaragua, which, under the terms of the present monetary law, was obliged to exchange New York funds or gold for cordobas at the par rate for U. S. gold. All the other banks in Nicaragua suspended the sale of drafts, and in consequence of this the Banco Nacional was called upon to carry the heavy burden of supplying the entire demand. After a short time, it likewise was obliged to suspend the sale of drafts on New York thus taking advantage of a moratorium decreed by the government.

According to last advices, certain of the local banks and export houses in Nicaragua have resumed in a small way the sale of New York exchange, but on the basis of a premium of from 20 to 23 per cent, with a rising tendency.

In view of the existing moratorium, and of the high premium for exchange on New York, the collection of bills on Nicaragua is very difficult, and delays and evasions are to be expected.

* Manager Foreign Department, The National City Bank of New York.

One of the most significant statements that have appeared in a long while is that belligenents are placing new munitions contracts in this country. The munitions business had begun to pall. The nations would place no orders for delivery beyond January 1st, 1917. The new contracts specify delivery by May 1st, 1917. This change is indicative seemingly, that the powers expect the war to continue for some months more, indeed that they are already planning operations for the summer of 1917. The steel industry may be considered one of the barometers by which the coming of peace may be detected.—*Commerce and Finance.*

Mill Conditions and Market Reviews.

Southern Mill Situation.

Perhaps the paramount feature of the month among Southern cotton mills was the very severe tropical storms which were followed by abnormal flood stages on the principal rivers of North and South Carolina, Georgia, Tennessee and Alabama. Quite a number of mills were affected in a more or less serious manner, it being reported that some mills were practically destroyed. Quite a number were affected for a period of one or two days owing to severe flood conditions at the hydro-electric plants which furnished these mills with current. Other plants operated at full capacity during the entire period and supplied their customers with current promptly and without apparent difficulty. Another serious feature in the flood area was the destruction of a great many railway and highway bridges and the practical stoppage of all kinds of traffic. This is being rapidly remedied and conditions will soon be at normal.

The effect of this serious flood and rain storm on the growing crops of cotton has not as yet been fully recognized by those not in touch with the situation. It is probable, however, that if the territory west of the Mississippi succeeds in securing sufficient rain fall to keep its cotton crop in top-notch condition, it will doubtless equalize any deleterious effects that may have taken place in the southeastern states.

The arrival of the German submarine merchant vessel at Baltimore, loaded largely with German dyestuffs, has, in a measure, succeeded in disturbing the entire colored goods situation. While it is frankly admitted by dyestuff dealers and textile manufacturers that any dyestuffs contained in this cargo could not by any stretch of the imagination be sufficient to have any appreciable effect upon the manufacturing situation the uncertainty as to whether or not other submarines will follow this one, has created a kindred uncertainty in some sections of the colored goods market which is reflected directly in the slacking up of orders which were being placed. Goods that were being dyed with certain of the natural dyestuffs and that were admittedly not fast colors, were being accepted by the trade promptly and ordered out even voraciously. Such orders have noticeably slackened and where possible, are being held in abeyance until such time as the prospective buyers are convinced that German dyes in sufficient quantity will not be available to the trade.

Comment was made in these columns last month on the various court orders in reference to the sale of the Hampton Cotton Mills division of the Parker Cotton Mills Company. As soon as the judges decided to allow the sale of these mills to be made under bond, the officers of the Parker Cotton Mills immediately took action, and the mills were disposed of. The four cotton mills at Columbia, S. C., formerly belonging to the Hampton division, were secured by the Pacific Mills of Lawrence, Mass., and will be operated as a part of this corporation and will be known as the Hampton Department of the Pacific Mills. Irving Southworth, formerly superintendent of the Cocheeho Department of the Pacific Mills, at Dover, will be agent of the Hampton Department, and General Superintendent, W. P. Hamrick, will continue in the position he has occupied for sometime as general superintendent of this division. It is stated that the manufacturing personnel of these mills will be kept intact, and little, if any, new machinery added.

The mill management department of Lockwood Greene & Co., Boston, the original purchasers of the Hampton Division, will operate the Moultrie Mills at Edgefield, S. C., the Winnsboro Mills at Winnsboro, S. C., and the Wateree Mills at Camden, S. C., under the general supervision of A. R. Dickenson as general manager. Mr. Dickinson has charge of the Southern section of Lockwood Greene & Co.'s mill management department, and has for sometime past been operating mills at Lagrange and Hogansville, Ga., where he has been entirely successful. There is little doubt that under his efficient management the three mills in question will continue to operate profitably.

A new corporation known as the Victor-Monoghan Mills, capitalized at $7,000,000, with $2,000,000 of preferred stock, will own the plants at Greenville, Seneca, and Walhalla, S. C., previously owned by the Monoghan Mills, and also the three plants at Greer, one at Jonesville and one at Union, S. C., previously owned by the Victor Mfg. Co. The total spindleage of these plants amount to 239,935.

The mill of the J. M. Odell Mfg. Co., at Bynum, N. C., was destroyed by a fire caused by lightening, on July 2nd, the loss being estimated at $100,000, $70,000 of which was covered by insurance. It is reported that this yarn mill will be immediately rebuilt.

A new organization has acquired the buildings formerly occupied by the old Commonwealth Cotton Mills Co., at Durham, N. C., which has not been in active operation for sometime, and will equip this plant with new machinery and operate it entirely as a yarn mill. This mill will be known under its new management as the Duke Yarn Mills Co.

The Aspen Cotton Mills Co., at Fayetteville, N. C., has been recently incorporated. The officers of this mill are M. D. Hoffman, Philadelphia, president; W. E. Kinley, Fayetteville, vice-president; Arthur J. Flemming, treasurer, and W. D. McNeill, secretary and general manager. Mr. McNeill is also connected with the Millen (Ga.) Cotton Mills. The Aspen Cotton Mill was formerly known as the Holt-Morgan Mills and contained 11,000 spindles and 434 looms with the necessary equipment for finishing. The dye house contains the necessary machinery for dyeing, and there are a number of tenement houses on the property. It is understood that this mill will spin largely ply yarns of from 36's to 40's.

The Gate City Cotton Mills at Atlanta, Ga., contemplate the building of fifteen additional operatives' houses.

The Haynes Mills at Raleigh, N. C., has been incorporated with a capital stock of $300,000. The incorporators are R. R. Haynes, and others.

A recent incorporation at Columbia, S. C., is known as the Addison Mills, which have a capitalization of $175,000.

Wm. Elliott and E. W. Mullins are the incorporators, and it is said that cotton cloth will be manufactured.

Improvements are being made to the plant of the Lannet Bleachery & Dye Works at West Point, Ga., notice of which was made in these columns sometime ago. The buildings are being renovated to bring them up to date and new equipment installed.

An additional mill is to be built by the James N. Williamson & Sons Co., at Burlington, N. C., for which building and machinery contracts have been awarded. The addition will be 166 x 50 ft., of mill construction, the contract having been awarded to the Gallavan Building Co., at Greenville, S. C. This mill will contain 5,000 Whitin spindles and will have a daily capacity of 6,000 pounds of yarn. Electric power will be used from the lines of the Southern Power Co.

The Blair Mills at Belton, S. C., will build an addition 128 x 80 feet, one story high, to be used as a weave shed in the manufacture of Turkish towels. J. E. Sirrine at Greenville, S. C., is the architect engineer.

Two plants for manufacturing cotton linters will be built by the Mississippi Hull Fiber Co., of Memphis, Tenn. The Memphis plant will consist of a frame building with sheet iron sides and an equipment of machinery of a daily capacity of twenty-five bales of linters. The other plant of this company will be built at Marianna, Ark. This company was organized with a capital stock of $50,000 by Joseph Newberger, who will be president and J. H. McNeil, will be secretary and treasurer.

The Noble-Beveridge Mfg. Co., of Cedartown, Ga., has been organized by F. D. Noble, Geo. Beveridge and F. J. Bounds, all of Cedartown, to bleach, dye, waterproof and manufacture cotton duck. They have already purchased some machinery, and it is reported that they will later add spinning and weaving machinery to the plant.

It is reported that the Mooresville (N. C.) Cotton Mill will add an additional plant with from ten to twenty thousand spindles and accompanying looms. This was decided at a recent meeting of the stockholders providing certain conditions could be met. About 20 acres of adjoining land has recently been purchased.

The Hamilton Carhartt Cotton Mills of Rock Hill, S. C., propose the erection of a new mill at Carhartt, S. C., to manufacture denim.

The Baldwin Cotton Mill, at Chester, S. C., has been incorporated with a capital of $500,000, by Alex Long, of Rock Hill, S. C., and Carroll Baldwin, of New York, and takes over the Wylie plant of the Hampton Cotton Mills Co., at Chester. It is reported that this plant will probably be increased to 30,000 spindles. The present equipment is 21,504 spindlss and 640 looms for the manufacture of fancy cotton goods.

The Lang Mfg. Co. mill at West Point, Ga., was sold at public outery by the trustee in bankruptcy on Monday, July 24th, the buildings and machinery bringing $23,200. The purchase was made by Alexander & Garsed of Charlotte, N. C., but is subject to the acceptance of the court.

Plans have been perfected for the building of another big mill at Porterdale, Ga., by the Bibb Manufacturing Company, the work of construction to begin just as soon as the material arrives. The building will be of brick and have 20,000 spindles. There will be about 300 additional operatives needed for this new mill. Electric power will be used exclusively, and cotton yarns manufactured. The erection of this mill will necessitate the building of many more residences for the operatives.

New England Mill Situation.

New business has been coming in more slowly to the mills in the past month but there are no complaints of accumulating merchandise. In fact the bleacheries and finishing works have more work in hand than they can attend to properly, and the mills, hampered by a shortage of labor, are glad of an opportunity to catch up with back orders. In the absence of what might be termed even a moderate volume of new orders, the steadiness and firmness of prices has been remarkable.

During the month new prices were named on dress ginghams and other yarn dyed lines for the spring season of 1917. Values named by leading mills varied from 18 to 30 per cent higher than a year ago, the average being fully 25 per cent up, the lower advances being on some few specialties such as romper cloths or some other highly competitive standard lines. The dress ginghams that sold for 7 cents last season are now priced at 9½ cents, the shirting chambrays that sold at 6¼ and 7 cents are now priced at 9 cents, and the finer dress ginghams that sold in a limited way last year at 9¼ cents are now bringing 10½ cents for larger quantities than buyers took a year ago.

Mills have not been expecting that buyers would want full lines at these high prices. In some instances, however, the committments have been on a larger scale, notably on bleached madras, indanthrene shirting chambray, and on the finer grades of dress ginghams where more attention has been devoted to novelty patterns and high colors. Nearly all the leading gingham mills of New England are guaranteeing their colors, showing that they have bought dyes as they needed them, at the exhorbitant prices that have been ruling for limited quantities. In the matter of dyes, the most notable feature of the spring openings was the announcement of the Amoskeag Company that all its colors are guaranteed fast and of the usual standard of quality.

At this time it is thought probable that buyers will not order a full product from the mills for the coming year. This is causing no uneasiness as some mills are very desirous of continuing to develop the large export trade that has come along on ginghams of all kinds. Moreover, manufacturers think that if buyers do not commit themselves as fully on all lines as they did when prices were lower, there will be open for them the possibility that better prices will be obtained if the wars go on. There is no prospect at this time of any looms remaining idle for the balance of the year in consequence of a lack of orders. Where looms are idle at all, it is due chiefly to the scarcity of desirable operatives.

The bleached goods trade has held up remarkably well. Prices did not decline any last month although new orders were light. The explanation is found in the fact that bleachers have been unable to fill back orders or meet the demand for spot shipments. Many of the bleacheries have been greatly handicapped by the lack of men in the departments where only men can be employed, while the lack of operatives in the finishing departments has been so great that where goods could be finished they could not be

packed promptly. A month or more ago gray goods prices dropped from ¼ to ⅜ cents a yard from the top prices of the year, yet sales of finished goods were made without concessions of more than ⅛ cent at any time. The standard brands are so well under order that there is no question of values remaining firm during the fall jobbing season.

There has continued to be a steady demand for the finer grades of bleached cottons; longcloths, nainsooks, linons, and fine cambrics have been asked for in excess of the supply. Many of these goods are being exported to new markets. The shirt manufacturers and the underwear manufacturers have been calling for unusual quantities of fine bleached cottons all this year and at times spot deliveries have commanded premiums. There has been no let-up in the demand for wide sheetings, and although more pillow tubing is being made than ever before, prices have ruled steady.

Formal openings of the season of 1917 in wash fabrics and white goods drew many buyers to the markets. Numbers of converters were unable to show full lines owing to delays in finishing. The expectation that the new season would open irregularly has been fulfilled and it is causing manufacturers no uneasiness. The current year's selling was interfered with by weather conditions and by the vogue of sport stripes of all kinds. The printed sheer wash fabrics did not move well and are held in stock by some retailers and by some of the western jobbers. The eastern jobbers were able to sell a great many goods for export without the usual price sacrifices, and they have not complained of the congestion in these lines.

While the showings of new goods did not contain so many high novelties as a year ago, there is little reason to feel discouraged about the willingness of mills to meet the call for the higher priced cottons now so well set in this country. Of the new goods, many are priced as high as 37½ cents a yard, and some even higher. Some very beautiful novelty striped voiles in very fine yarns are offered. There has also been a progressive development of fancy gabardines, and a return to the very fine fancy poplins and ornate basket weaves in multi-colors. In contrast with the very sheer season this year, the coming season tends toward more serviceable fabrics although in all collections a preponderance of voile weaves is noticed.

Prices on fine goods are very much higher than a year ago. There is more or less irregularity, as some converters who did not use their gray goods have carried them over into converted lines for the new season, and they are offering the finished goods at prices that have little or no relation to current producing costs. This condition will militate against the ready distribution of other cloths, but it is thought that unless there is to be some unlooked for check to consumption there will be a market for all the mills can make this year, at least. At present the mills are as busily employed as they can be.

Print cloth markets have not been active but stocks have not accumulated. Prices have recovered to a basis of 5¾ cents for 38½-inch 64 x 60's, the highest price touched for this year, and Fall River reports stocks of only 815,000 pieces, made up of many odd styles. Printed goods are so well under order that all the large printers have every machine in operation and will keep running in full until the early fall if no further business comes to hand. Heavy runs are being made on percales and on draperies. The demand for black goods from finishing works is large and the finishers note a tendency toward more piece dyed goods. Another style tendency that is becoming more marked is a call for fine colored organdies.

The yarn trade has been phenomenal. All the yarn mills have large orders in hand and many prices quoted on combed yarns are as high as any ever reached in this country, certainly in recent years. Mills that spin warps for the men's wear trade have taken huge orders, and some mills that specialize on knitting yarns have booked all the business they can take for this year. The large manufacturers of fine carded yarns on cops, and other fine mule spun qualities have more business than they can take care of for months and prices, while nominal are in many instances the highest known in a generation. The call for twisted yarns of all sorts is in excess of the ability of spinners to meet and the requests for coarser numbers of combed yarns are becoming more insistent every week.

The knit goods mills have never enjoyed prosperity in the measure now seen. The hosiery mills are overwhelmed with orders for export and for the domestic trade. There is a good demand for the very finest qualities of knit goods at prices that are tempting mills to again go into the very fine lines that were made here in the days before foreign competition stifled that part of the industry. Less trouble is being anticipated than was feared in getting the higher prices demanded by the increased costs of production, buyers now demanding deliveries more than price.

Reports from the various machine shops tell of a very active business. Some of the shops are compelled to decline very attractive offers owing to inability to handle any more. Hope is expressed that with the lessening of the demand for ammunition workers in some parts of the country there may be more workers available for machinery building. Up to the present time it is not possible to take a great deal of export business offered. It is stated by some investors that prices for the equipment of a mill today are not so much higher than they were before the war if it is kept in mind that prices for the products of mills have gone up greatly. An instance was cited last week of a manufacturer who desired to double his plant and who figured on contracts for about 25,000 spindles. The final figures showed that the machinery could be installed for a little over 27 per cent above the prices paid two years ago. Contrasted with advances of 40 and even 50 per cent for many cotton mill products in the interval, the prices for machinery are not too high to discourage new investment for the coming spring.

The labor situation shows no dangerous tendency for the time being. There have been some minor strikes in various concerns, largely the outgrowth of pressure for higher wages. There is a great deal of machinery idle in some places, especially where operatives can reach camps near the seashore. Manufacturers in many instances are content if they can maintain an 80 per cent product during the heated spell and as all lines are suffering from the same cause, a real scarcity of surplus help, little difficulty is encountered in having buyers accept any goods that are overdue. Apprehension is expressed in some places lest there may be further wage demands this fall if the wars go on in Europe, but it hardly seems probable that they will be pressed with the consent of labor leaders when the term of employment may be made uncertain by talk of peace.

Lancashire Notes.

BY AN ENGLISH CORRESPONDENT.

The employers scored a considerable victory in the recent wages dispute. At the eleventh hour all parties consented to arbitration by the Government arbiter, Sir George Askwith, who awarded the operatives a five per cent advance. The application had been for an advance of ten per cent and the operatives expected that the least they would receive would be 7½ per cent. The employers' victory lies in the fact that the award compels them to pay no more than they themselves offered on condition that the operatives would enter into a ten years' agreement. Under this proposed agreement no alteration in wages was to be more than five per cent at one time and two years was to elapse between every such change. Under the award there can be no further alteration in wages until February next, and when that time arrives it is most probable that a bitter struggle will ensue. The award has brought arbitration—never popular in the trade—into very bad odor, and it will take much to induce the operatives to accept it again, even should the war be unfinished. If the war be over, it is certain that they will not consider it for a moment.

The Textile Committee of the Board of Trade has begun its investigations into the cotton industry. The committee is one of several which have been appointed by the board severally to deal with various branches of industry and commerce. Its business is to make a thorough investigation into all the conditions of the textile industries, with special reference to their relation to internaional competition. The object of the commttee is to provide information on the basis of which steps will be taken to insure that after the war the position of the textile industries will be maintained, and, if possible, improved. Special attention, of course, is being given to the question of competition by enemy countries. So far as the cotton trade is concerned, only the evidence of merchants has up to now been taken; evidence by manufacturers and spinners will follow. The committee, as is usual with such inquiries, is sitting in private, and nothing of its proceedings will be made public until the final report is issued.

To the monthly meeting of the council of the British Cotton Growing Association is was reported that the purchases of cotton in Lagos up to May 27th amounted to 7,845 bales, as compared with 3,332 bales for the corresponding period of last year, and 12,041 bales for 1914. The purchases in Northern Nigeria up to the same date amounted to 10,066 bales, against 333 bales for the corresponding period of last year, and the former maximum of 2,135 bales in 1912. The Lieutenant Governor and the Resident recently paid a visit to the association's ginnery at Zaria, and it was reported to the council that they were astonished at the quantity of cotton which had been purchased. Since June last year shipments of cotton have come forward from Nyasaland in what is considered to be a very satisfactory manner, 4,016 bales having been shipped to the association. During 1915 the output of cotton in this region amounted to 8,026 bales, and in Uganda to 24,530 bales. A statement submitted to the meeting showed that the number of bales sold by the association during the previous month was 35,013.

The outbreak of war brought home to the British textile industries how dependent they were on German dyes, and it brought home to the British furnishing trade how dependent it was on foreign fabrics. The cutting off of the supply of continental upholstery fabrics has been a source of serious difficulty to the furnishing trade, for a considerable proportion of these goods came from Germany. It is now being considered whether in the future the two trades might not co-operate to an extent which would enable the British textile manufacturer to meet the British furniture-maker's needs. It was for the purpose of raising a discussion on this subject that the Chairman of the Council of the Textile Institute (Frank Warner) attended the recent conference of the National Federation of Furniture Manufacturers, and addressed the delegates. If this beginning could be developed into close co-operation, the cotton manufacturer might find an opening in a branch of trade hitherto neglected; in the provision, for example, of cotton moquettes, now very dear owing to scarcity. If the trades concerned show some initiative and enterprise, the Board of Trade would certainly have assistance, but as the Board frankly informed them early in the year, it was for the trades themselves to make the first move.

In my notes last month I related that the Master Cotton Spinners' Federation had approached the Home Office with a view to obtaining a relaxation of the Factory Act so as to allow children to clean machinery whilst it was in motion. The object was to enable employers to make as much use as possible of young workers in view of the difficulty of running the mills with the number of operatives greatly reduced. However, the Home Office was not convinced, and the Act will remain unaltered. Every day more men are called to the colors and the serious problem of the labor shortage becomes still more serious. In Oldham at least 25 per cent of the spinners and piecers are now with the Army and Navy, and from Bolton 2,500 piecers have enlisted. Such heavy withdrawals of labor are characteristic of every town and district in the cotton area.

The Yarn Market.

The situation of the yarn spinners from a market standpoint during the past month has been all that could be desired. Satisfactory contracts continue to be made, and with the exception of certain Southern mills which were more or less damaged by the serious flood in the early part of July, the mill men are expressing themselves as being satisfied with conditions.

Early in the month carded yarns were hard to get, and some dealers had no fine yarns for quick deliveries. Prices were firmer and spinners quoting above the market. Carded weaving yarns were slow, but the market was firmer than the previous week had been. On the other hand, weavers were reporting that in some lines they were getting little business.

The holiday season naturally interrupted business somewhat, and it was also vacation season for many, which made trading quiet in all lines. Later in the month there was considerable activity in spots and large quantities of yarn was sold for future delivery. There was considerable complaint among buyers because yarns purchased on early low priced contracts were not being delivered promptly. Combed yarn prices continued firm, although the tendency

to advance was not so marked in the 2-plies as in the single yarn.

As the month closes, the demand for carded yarns on cones continues good, and some exceptional contracts have been reported closed. Weaving yarns continue rather slow, with somewhat irregular prices. Following are middle of the month quotations on the Philadelphia market:

Southern Single Skeins.

6s to 8s	21½@22	10s	22 @22½
12s	22½@23	14s	23 @23½
16s	23½@24	20s	25
24s	25½	26s	26 @26½
30s	30 @31		

Southern Single Warps.

8s	21½@22	10s	22½
12s	22½@23	14s	23 @23½
16s	23½	20s	25 @25½
20s	27 @28	30s	31
40s	41 @42		

Carpet and Upholstery Yarns in Skeins.

8-4 slack	22 @22½	9-4 slack	22 @22½
8-3-4 hard twist	21½		

Southern Two-Ply Skeins.

8s	22 @22½	10s	22½@23
12s	23 @23½	14s	24
16s	24½	20s	27
24s	30 @30½	26s	30½@31
30s	32 @32½	40s	43 @45
50s	56 @58		

Southern Two-Ply Warps.

8s	22 @22½	10s	22½@23
12s	24 @24½	14s	25
16s	25½@26	20s	27½
24s	30 @30½	26s	31 @31½
30s	32½	40s	44 @45
50s	57 @58		

Northern Two-Ply Carded Peeler Skeins.

20s	29 @29½	24s	32 @32½
26s	33 @33½	30s	35 @36
36s	39 @40	40s	49 @50
50s	60 @61		

Two-Ply Combed Peeler Skeins.

20s	37 @38	24s	39 @40
30s	46 @48	40s	57 @59
50s	67 @69	60s	77 @80
70s	88 @90	80s	98 @1.00

Southern Frame Spun Yarn on Cones.

8s	23 @23½	10s	23¼ & 24
12s	24 @24½	14s	24½@25
16s	25 @25½	18s	26
20s	26 @26½	22s	26½@27
24s	27½@28	26s	28 @28½
30s	29 @30		

Northern Mule Spun Carded Yarn on Cones.

10s	25 @25½	12s	25½@26
14s	26 @26½	16s	26½@27
18s	27 @27½	20s	27½@28
24s	28 @28½	26s	28½@29
30s	32 @33	40s	44 @47

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	32 @32½	12s	32½@33
14s	33 @33½	16s	34 @34½
18s	35 @35½	20s	35½@36
22s	36 @36½	24s	36½@37
26s	37 @37½	30s	42 @44
36s	47 @48	40s	50 @52

Cotton Comment.

BY H. AND B. BEER.

New Orleans, July 15th, 1916.

The market ruled comparatively steady during the past month owing to the continuance of favorable weather conditions west of the Mississippi River being offset by unfavorable climatic conditions in the eastern half of the belt.

Following the breaking of the drouth in the east gulf and south Atlantic states last month, incessant rains have been the rule in that section, the precipitation being unprecedented in sections of Mississippi, Alabama and Georgia, heavy in other districts, due to the hurricane which appeared off the east gulf coast last week.

As a result of the high winds and torrential rains, hill lands were badly washed, low lands inundated, the damage to crops being irreparable in the bottoms because of crops being washed away, and elsewhere in the eastern belt fields have become grassy, foul in many instances, owing to cultivation being retarded because of the bad weather.

On the other hand crop accounts from Texas, Oklahoma, Arkansas, Tennessee and Louisiana are very promising as result of favorable weather west of the Mississippi the past month, but weevils are reported in Louisiana, Arkansas and Texas where some damage is being done.

It is generally thought that the wet weather in the eastern belt will be favorable for the propagation of the weevils in that section, and serious damage is feared in Alabama.

With an unfavorable outlook for the crop in the east gulf and south Atlantic states, the trade is in no position to experience a setback to the crop in Texas. Rain is commencing to be needed in Texas, particularly in the northern two-thirds of the state, and it is to be hoped that the needed moisture will soon be provided. If not the prospects for the crop, as a whole, will become all the more unfavorable.

Consumption of cotton in the United States continues on a record-breaking scale, for the month of June 570,000 bales exclusive of linters vs. 515,000 last year, for 11 months of the season 5,906,000 bales exclusive of linters against 5,101,000 for corresponding time last season, the increase over last year for the whole season pointing to nearly 900,000 bales exclusive of linters. To the end of May 779,000 bales of linters were consumed vs. 309,000 for ten months last season. There was no report on quantity of linters consumed last month, but it is expected in a day or two.

Manufacturers stocks in the United States June 30th were 1,823,000 bales, last year 1,624,000, in public warehouses 1,530,000 vs. 2,086,000, or a total available in the United States of 3,353,000 compared with 3,710,000 last year.

There is every indication of the continuance of a heavy consumption of cotton by the American mills as the number of active spindles in the United States at the close of June was 32,259,000, last year 31,226,000.

Exports of raw cotton from America is comparatively large for this time of the year, last week 101,000 bales, corresponding week last year 40,000, making total since August 1st, 5,714,000 against 8,218,000 to even date last season. Exports this season will likely figure about 6,000,000 bales vs. about 8,350,000 last season exclusive of Canada and Mexico.

The world's visible supply of American on July 14th was 2,340,000, last year 3,610,000, of which there is in the United States 1,074,000, last year 1,282,000, in Europe only 1,266,000 vs. 2,358,000, of which Liverpool is in possession of only 701,000 against 1,401,000 one year ago.

The future of market will likely be governed principally by weather developments and prospects for the new crop, upon which the whole world is depending for next season's requirements.

The British Board of Trade Returns show the exports of cotton yarns and cloths from Great Britain during June, and for the year to date, with comparisons, as follows:

	June	Since Jan. 1.
Yarns, pounds	18,000,000	90,843,700
Last year	18,590,000	102,449,200
1914	17,233,000	113,414,200
Cloths, yards	501,000	2,672,103,500
Last year	429,946400	2,291,305,300
1914	498,504,900	3,465,258,300

COTTON MANUFACTURING.

Spinning Speed Variation.

BY HENRY K. DICK.

"At what speed do you run the front rolls on your spinning frames?" was asked of a spinning room overseer who had charge of a spinning room on 14's warp and 14's filling.

"140 r.p.m.," was the reply.

A test made at the time showed the front roll running at 125 r.p.m. or 12 per cent lower than the standard. Expressing this as a loss in production, it would amount to 1900 pounds in 60 hours.

In how many of our mills do we find like conditions?

Taking another example of a spinning frame spinning 30's warp, the front roll speed was taken and found to be 92 r.p.m. An examination of the driving belt found it to be in a very dry condition. An application of belt dressing was resorted to and another test was made on the speed of the front roll, and the speed had risen from 92 to 114, an increase of 24 per cent.

A calculation was then made to find what the per cent slip was on this same belt after treatment with belt dressing. The speed of line shaft was 359 r.p.m. Size of the pulley 32 inches. Spinning frame pulley 10 inches. Thickness of belt 3/16 of an inch. The theoretical speed of the frame pulley was calculated as follows: $359 \times (32 + 3/16) \div (10 + 3/16) = 1128$ r.p.m. That is the speed of the pulley would be 1128 without any belt slip. On finding the actual speed by using a speed indicator, it was found to be 1087 r.p.m. This result gives a belt efficiency of 96 per cent. An individual test is never satisfactory. What is wanted is a test on the whole spinning room.

To find out just what the variation was on frames spinning the same yarn and under same conditions, speeds were taken on 25 frames of 208 spindles each, making a total number of spindles of 5200. The yarn being spun was 25's warp. The front roll speeds were taken and they varied from 113 to 127. The percentage of variation from the average (122) was 11½ per cent. A standard speed for 25's warp is 125 r.p.m. The production per spindle on this yarn at the speed given is 1.68 lbs., this allows for 10 per cent stops. The production per spindle at 122 revolutions per minute is 1.64 lbs., showing a loss on 5200 spindles of 250 lbs. per week (60 hours).

Another calculation was made to determine the maximum efficiency of spinning frames on this same yarn. The bobbin was carefully weighed and found to contain 1 ounce of yarn.

A	Yards of yarn on bobbin	1320
B	Yards per minute	10.65
C	Minutes to fill bobbin	124
D	Minutes for doffing	5
E	Minutes per week	3600
F	Revolutions per minute of front roll	122
	Diameter of front roll	1

$$\frac{A}{B} = C = \frac{1320}{10.65} = 124 \text{ Minutes to fill bobbin.}$$

$$\frac{E}{C+D} = \frac{3600}{124+5} = 28 \text{ doffs per week.}$$

$$\frac{E}{C} = \frac{3600}{124} = 29 \text{ doffs per week 100 per cent efficiency.}$$

$$\frac{28}{29} = .965 \text{ or } 96\tfrac{1}{2} \text{ per cent maximum efficiency of spinning frame.}$$

The data here given represents what has been done in one particular case to increase the efficiency of the spinning and it is hoped by passing it along, it may induce similar experiments to be done by other men who may find themselves up against similar problems.

Yarn Sizing and Testing.

BY "ALBERT."

Altogether too many overseers fail to recognize the importance of properly sizing and breaking the yarn. The yarn reel and breaking machine are the pulse of yarn manufacturing, and not only indicate spinning room conditions, but also what kind of work is being done in the card room, and how the work will run in the weave room. Some overseers treat yarn sizing as a sort of necessary evil, and a part of the routine work that is to be done as expeditiously and easily as possible, and frequently delegate this work to a second hand, or some one else. This should not be the case, as it is of the utmost importance that the sizing and breaking should be done carefully and regularly, and, as far as possible, by the same person, for the sake of uniformity.

In the first place at least eight bobbins of each number should be sized, and of these eight, four should be from roving taken direct from the roving frame to the spinning frame, that is, taken from a doff that comes from a frame at as near as possible to a designated time each day. A good plan is to take size roving from doffs as near to 9 a. m. each day as possible, sizing eight bobbins from each hank, for the card room report, then this roving should be put in spinning frame at once. The four bobbins of yarn from this size roving, and four bobbins taken at random, should be sized from each hank roving, together with eight bobbins from each number of yarn made from the same hank. If more than one number is being made from the same hank roving the special size roving can be used for one number, and the sizing for the other numbers may be made from yarn picked at random.

The sizing for the spinning room should also be done at a specified time each day, and from two to three o'clock in the afternoon is a good time, as it gives a chance to get size yarn from the size roving received from the card room in the morning. Conditions vary somewhat during each

day, and if the sizing is done at a given time each day, it makes a fairer comparison from day to day than if the sizing is done at "any old time."

The yarn to be sized should be taken from doffs nearest to sizing time. Sometimes the size yarn is picked up at any time and allowed to remain at the overseer's desk until the sizing is made, and sometimes the atmospheric conditions at his desk are quite different from those in the spinning room itself, particularly if he has an enclosed office, and the result is that yarn that is picked up for sizing, taken to the office and allowed to stand for several hours in a too warm atmosphere, may weigh considerably different from what it would if taken direct from the frames, and may be enough too light to call for a change in gears, when, as a matter of fact, the average number of the yarn may be all right to give the desired weight of cloth. Of course, no change of gears should be made from the result of one sizing of yarn. If the regular daily sizing is sufficiently "off" to require a change, several more sizings should be made to verify the weight before a change is ordered, but changes have been made on the strength of one sizing, when, as a matter of fact, the average number was all right.

As to the sizing itself, the yarn should be given one or more turns around the guide wire, as may be necessary to give sufficient tension so that it will be wound around the reel without kinks, but *not* with enough tension to *stretch* the yarn. The same tension should be used on each bobbin each day. The ends of the yarn should not be wound around the arm of the reel, as is sometimes done, but should be wound around a spoke, or a wire attached to a spoke. The writer has seen instances where the yarn was wound around the arm of a reel until there was a bunch large enough, so that the threads in the skein of yarn that was wound over the bunch would be at least a quarter of an inch longer than if the arm was bare, and as there are eighty threads in a skein from a yard and a half reel, it would mean that there was at least twenty inches more of yarn in that skein than as if the arm was bare.

On skeins that are to be broken, the two ends of yarn should be tied together before removing from the reel, otherwise there will be one place in the skein, (where the two ends come together) where there will only be 79 ends to break instead of 80. In yarn that is to be sized only, it is unnecessary to tie the ends, but they should be carefully broken, so that there will be 120 yards in each skein, and not 120 yards, *more or less.*

In weighing the yarn the scales should be placed upon a level foundation, and should be balanced before starting to weigh each day's weighing. Much care should be used in securing accurate weight. Some men seem to think that if the beam does not go up or down as far as it can go, that it is near enough, but the weight should be moved until the beam is as near center as possible, or in other words, until a correct balance is obtained.

In breaking skeins, they should be placed on the hooks and then moved up and down several times to straighten out the threads, and on a hand breaking machine as near a uniform speed as possible should be maintained from start to finish on each skein each day. A power machine is the best, because it is always uniform in speed, but with a hand machine, it is possible, with a little care, to maintain a fairly uniform speed, which should not be too fast or too slow.

The superintendent should know at all times, what kind of stock is going through, and if he does, and has a carefully made size and break report, he should be able to judge pretty closely as to how the work is going in the carding and spinning rooms, and how it will go in the weave room. But unless he has a reliable size and break report, there may be something wrong that will not show up until it begins to run badly in the weave room, and even if the trouble is located promptly, there may be a lot of work in process to be used up before the work is all right again; whereas, all this trouble might have been avoided, if the "pulse" had been timed accurately, and the proper deductions made from the size and break report.

One point to be watched carefully, is the variations in yarn that is supposed to be the same number, and not to depend too much on averages. Number 30 might be wanted, and the average might be as close to that number as could be expected, but if a part of the yarn is number 28 and a part number 32, the average might be 30, but the work would not run as it should in any department; and while there might or might not be a noticeable decrease in production, and the work might be kept up fairly well in each room, yet everybody would have to work harder to keep up the work, and after awhile, both production and quality would suffer.

In the long run, the overseer, superintendent and mill, where care is exercised in getting a careful and accurate size report, other things being equal, will be more successful, than in the mill where care is not exercised in this important matter.

Designs for Fancy Cotton Fabrics.

BY T. WOODHOUSE AND J. IRELAND.

PART THIRTY-ONE.

The fabric illustrated in Fig. 138 is an excellent example of a check design made by a combination of two

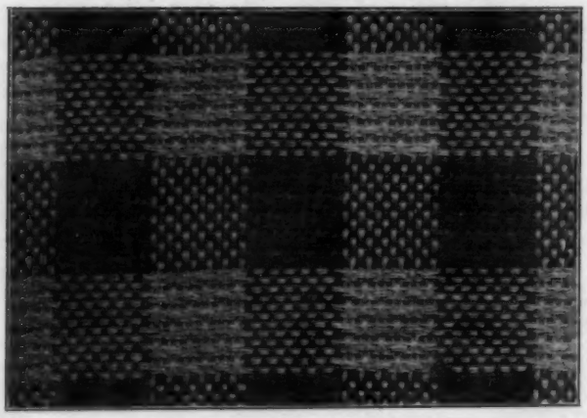


FIG. 138.

simple weaves and two colors of yarn. The warping and filling particulars are:

Warp—24 threads white, 24 threads yellow; 44 threads per inch.

Weft—24 picks white, 24 picks yellow; 40 picks per inch.

The checks are formed alternately of an open texture and a texture of a matt surface.

The complete pattern requires 48 threads and 48 picks, as will be seen from the unit design D in Fig. 139. The design is divided into four squares and is of a dice nature. The 2/2 basket, matt or hopsack weave is inserted into two of these squares, while the 8-thread imitation gauze weave fills the remaining two squares. This imitation gauze weave could be woven with 4 harnesses, while the

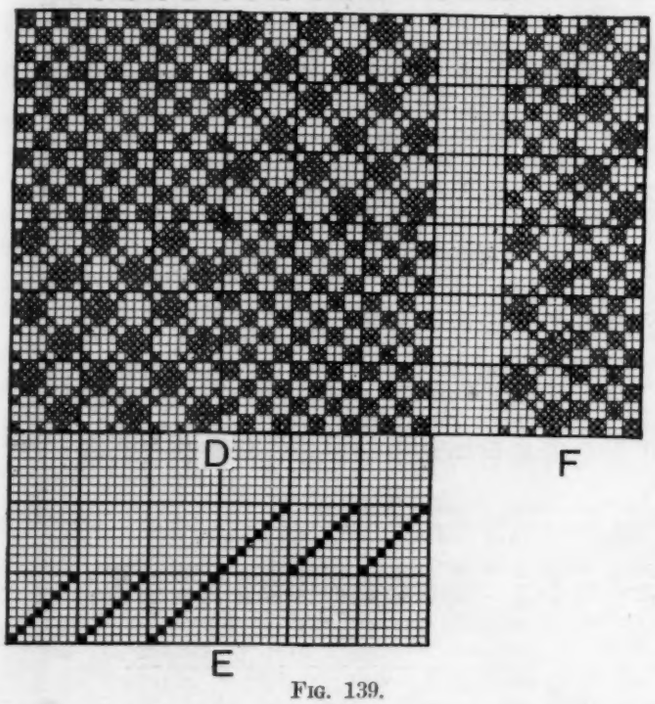


Fig. 139.

basket weave could clearly be woven with two harnesses. If the two weaves were combined to form a stripe design, say, such as would result if the first 8 picks of design D, Fig. 139, were used, then 6 leaves only would be required. When, however, the two weaves are combined to form a check or dice pattern in the particular manner illustrated, 16 harnesses are necessary. The draft for the design D is shown at E, while the weaving plan on 16 by 48 appears at F.

Returning to the cloth in Fig. 138, it will be seen that those squares which are developed by the imitation gauze weave are solid in color, that is, alternate squares of solid yellow and solid white. On the other hand, the squares developed by the 2/2 basket weave are compounded of both colors—the white filling interweaving with the yellow warp in one section, and the yellow filling with the white warp in the other section.

In combining two weaves such as those shown in Fig. 139, it is absolutely impossible to have cutting threads and cutting picks at the junctions of the respective squares. If, however, the basket weave were started on the second thread and the second pick of the weave instead of starting the weave as illustrated, a near approach to the ideal condition of cutting at the junctions would result. In this case it is obvious that the first and last threads and the first and last picks of the basket squares would be single threads, instead of having two similar threads and two similar picks at these places, and this might be considered a fault in the construction.

Another distinct advantage would result if the basket portions started and finished with a single thread, for this arrangement would enable the cloth to be woven with 8 harnesses instead of 16. The reader may imagine for himself the basket portion design moved one thread to the left with the first thread removed the other side of the square. The draft for the pattern would then be:

1 2 2 1 3 4 4 3 — then — 5 6 6 5 7 8 8 7

for 24 threads — for 24 threads

(To be continued.)

Curious Trade Names.

Trade names offer a rich quarry to the lover of the curious, and every long list of them brings unfamiliar names to light, says a writer in the journal of the Royal Society of Arts. The schedule of starred trades presents a few, including that of the "taper" in the cotton mill. The slightly derogatory flavor attaching to such a name is imperceptible in Lancashire, where a taper is a man of consequence. He has no connection with cotton tape of the ordinary variety, although a tape-like appearance is assumed by the parallel warp-threads that it is his business to treat. A taper is a sizer whose machine applies mucilaginous matter to the warp to facilitate its weaving. The machine at which he works is normally of the type called "slasher," and for greater security the official list names sizers thrice, first as sizers, second as slashers, and third as tapers. The "openers" of the cotton trade are in charge of the opening machines for cleaning and disentangling matted fibre, and the "scutchers" have a not dissimilar duty. The "overlooker" whose business lies with machines and operatives, is a functionary distinct from the "lookers-over" who practice a cultivated rapidity in noticing anything that is amiss with woven cloth. A "tackler" is a weaving overlooker and is the Lancashire equivalent of the Yorkshire "tuner." The "grinder" in a preparing or spinning mill, grinds to uniform length the wire teeth of the rollers and cylinders of the carding machines. "Fettlers" in the woollen trade perform other work in making ready the carding-engines, and when a fettler works in the worsted trade his name is "jobber." Among quaintly-named trades not mentioned in the list in point may be included the "slubber," who is concerned with light, loose, barely-twisted ropes of prepared fibre, and the "crabber," who crabs the shrinking and cockling tendencies inherent in undyed worsted cloth. The dyehouse has its "box-watchers," who have the function of watching patent dyeing machines, and its "top-siders" and "low-siders," who share between them an unequal responsibility for the due guiding and working of the cloth.

To judge if a yarn is suitable for mercerization, some of the fibre is subjected under a microscope to the action of a solution of caustic potash. The number of fibres that swell up denote the greater or lesser facility of the cotton. If this number is 75 per cent, poor mercerization would result. The experiment is carried out with a concentrated solution, containing equal parts of caustic potash and ammonia and the fibres are counted with an objective furnished with a special netting.

Graddick's Production Table No. 1

(Copyright, 1914, by F. C. Graddick.)

A production table for filling hosiery yarn spinning, showing the pounds per day per spindle that can be produced on spinning machinery in Numbers and tenths of average Numbers 4's to 31's at 11 hours per day. Allowance has been made for all necessary stoppage, such as doffing, oiling, banding, cleaning, etc.

Yarn No.	Square Root No.	Twist per Inch	Front Roll Speed	Spindle Speed	Lbs. per day Per spindle	Lbs. per day Per spindle No. & 10th	Lbs. per day Per spindle No. & 20th	Lbs. per day Per spindle No. & 30th	Lbs. per day Per spindle No. & 40th	Lbs. per day Per spindle No. & 50th	Lbs. per day Per spindle No. & 60th	Lbs. per day Per spindle No. & 70th	Lbs. per day Per spindle No. & 80th	Lbs. per day Per spindle No. & 90th
4	2.00	7.00	182	4000	2.65	2.59	2.53	2.47	2.42	2.36	2.30	2.25	2.19	2.13
5	2.23	7.83	180	4400	2.08	2.04	2.01	1.98	1.94	1.91	1.88	1.84	1.81	1.78
6	2.44	8.57	178	4800	1.75	1.72	1.69	1.67	1.64	1.61	1.58	1.55	1.53	1.51
7	2.64	9.26	176	5150	1.49	1.47	1.45	1.43	1.41	1.39	1.37	1.35	1.33	1.31
8	2.82	9.90	175	5450	1.29	1.27	1.25	1.24	1.22	1.21	1.19	1.17	1.16	1.15
9	3.00	10.50	172	5700	1.13	1.11	1.10	1.09	1.08	1.07	1.06	1.05	1.04	1.03
10	3.16	11.07	171	5950	1.02	1.009	.999	.988	.978	.967	.957	.946	.936	.925
11	3.31	11.61	168	6150	.915	.907	.899	.892	.884	.877	.869	.861	.854	.846
12	3.46	12.12	166	6350	.839	.831	.823	.815	.808	.800	.792	.785	.777	.769
13	3.60	12.62	164	6500	.762	.755	.749	.743	.737	.731	.725	.719	.713	.707
14	3.74	13.10	162	6700	.701	.695	.690	.684	.679	.673	.668	.662	.657	.651
15	3.87	13.50	160	6850	.646	.641	.636	.631	.626	.621	.616	.611	.606	.601
16	4.00	14.00	158	6950	.596	.592	.588	.584	.580	.576	.572	.568	.564	.560
17	4.12	14.43	156	7100	.556	.552	.548	.544	.540	.537	.533	.529	.525	.521
18	4.24	15.06	154	7200	.518	.514	.511	.508	.504	.501	.498	.494	.491	.488
19	4.35	15.26	152	7300	.485	.482	.479	.477	.474	.472	.469	.466	.464	.461
20	4.47	15.65	150	7400	.459	.456	.453	.451	.448	.446	.443	.440	.438	.435
21	4.58	16.04	148	7500	.433	.430	.428	.425	.423	.421	.418	.416	.413	.411
22	4.69	16.42	147	7600	.409	.406	.404	.402	.400	.398	.395	.393	.391	.389
23	4.79	16.79	145	7700	.387	.385	.383	.381	.379	.377	.375	.373	.371	.369
24	4.89	17.15	144	7800	.368	.366	.364	.362	.360	.358	.356	.354	.352	.350
25	5.00	17.51	142	7800	.348	.346	.344	.343	.341	.340	.338	.336	.335	.333
26	5.09	17.65	140	7850	.332	.330	.329	.328	.327	.326	.324	.323	.322	.321
27	5.19	17.84	139	7850	.320	.318	.317	.316	.315	.314	.312	.311	.310	.309
28	5.29	17.99	138	7900	.308	.306	.305	.304	.302	.301	.300	.298	.297	.296
29	5.38	18.29	137	7900	.295	.293	.292	.291	.290	.289	.287	.286	.285	.284
30	5.47	18.45	136	7900	.283	.281	.280	.279	.278	.277	.275	.274	.273	.272
31	5.56	18.66	135	7900	.271	.270	.269	.268	.267	.266	.265	.264	.263	.262

To find the production of any average number read to the intersection of the number nearest to the 10th, 20th, 30th, 40th, 50th, 60th, 70th, 80th, or 90th.

Slashing and Size Making.*

BY DANIEL W. POOLE.

I may be going too far back to begin this article but as it is impossible to get good slashing without good spooling and warping I will start there.

In the first place, I think whoever has charge of slashing should by all means have the warpers, nor would it be a bad idea for him to have charge of the spoolers. Then he can look right after the knot-tying which is no small item in making good running warps. Knotters should be looked after at least once every day and see that they tie a good knot, one that does not slip out when put in the warper-creels.

Spoolers are one of the least considered machines in a mill as all will agree who are familiar with the subject. They give very little trouble so far as repairs are concerned and as many mills have more spindles than are actually necessary, it allows for a certain amount of inattention around these machines that is not noticeable in other parts of the well kept room.

First class spindle bands are a prime requisite for good production. The speed of the spindles should be as high as the strength of the yarn will permit, say 700 to 1000 r.p.m. according to the number and quality of the yarn. Loss of production is often caused by overspeeding. It causes lots of broken ends for the spooler-tender to tie as the spool fills up.

The spool guides should be frequently gone over to make sure that they do not cause large and small end spools and tangled yarn. The man in charge should see that tenders run their ends in the guides and not over them. The guides should be of a pattern that can be set to suit the number of yarn being run and kept to exact gage, for when properly set they act as clearers for the yarn and prevent many an imperfection getting into the cloth as well as increasing the production in the weave room.

The necessity for not tampering with the guides should be carefully impressed on all spooler hands and at the same time encourage them by furnishing them with clean, even yarn, have loose and broken bands promptly replaced, bobbin holders set for least strain and the frame working smoothly in all its parts.

Right here let me say to the superintendent and overseer, pay by the pound, but see that a pound is delivered, for just at this place a good many dollars are lost every year.

The next important part is warping. At this point the result of bad work makes it impossible for the slasher-tender to turn out a first class warp for the weaver.

After selecting a good careful girl, one who will feel responsible for the work turned off the machines, she should have proper instruction and encouragement as well as good pay. I, for one, do not think it good business policy to try and get this work done for nothing. Most of you will agree that if you get a good article you have to pay for it, so in this particular case we can not vary from the rule.

The greatest trouble arising from poor warping is due to the crossing, lapping, and improper tying of broken ends. The operator in piecing up broken ends should make sure that the threads are absolutely straight and free from cross, also avoiding spreading the yarn with the fingers as much as possible. The machines should also be kept in good shape. Have them so they will stop when an end breaks. Do not let them run eight or ten yards before they stop after an end breaks. Keep the stop motion working accurately. See that drop wires are free, with an even spread. By arranging the creels so as to give the least possible friction on the yarn, the warper will stop at once when an end breaks. Keep the front comb set to make a good firm beam on the selvages. Threads allowed to run under or piled up on selvages will not run off on the slasher with even tension and will make soft selvages on the warp.

Care should be taken when starting a warper on empty beams to see that the yarn is pulled down on both ends of the beam at the same time. Notice that the clock is perfectly set; and set on the different warpers at the same place and position. For instance, if you set the clock on one warper before you begin to wind yarn on the beam, then on another after you have wound on enough to get up broken threads, you will have waste on the latter. Most warpers are equipped with a fine pitched measuring-roll-gear; and in stopping and starting, this roll often bounces and causes the gear to miss teeth on the clock-worm-gear. As the measuring roll is driven by friction of the yarn, this causes uneven length of yarns on the different beams and makes several pounds of unnecessary waste at the slasher.

The warper also furnishes the best position in the mill to judge the quality of the warp yarn being produced, as there are a large number of threads side by side, running at a speed which allows of a good inspection and comparisons of their varying sizes and other inequalities.

With all things looked after as they should be, the slashers should receive beams that will run out without the loss of a thread.

The foregoing are only a few of the little things to be looked after in preparation of the yarn for the slashers. I could write enough along this line to fill a newspaper; but that is not necessary, I believe if a man will give his close attention to the things I have mentioned it will include the whole.

We now come to the slashing which, to my mind, is one of the most important sections of the mill. I do not say that it is the most important, but no department demands a closer oversight from the overseer than slashing. Good, careful men should be selected for the slasher room; particularly the one who makes the size. The slasher tenders should be conscientious men with good sense, preferably of middle age, in whom one can trust. There are a lot of things to be considered right here. If a careless hand is on one of these machines, he can turn out more bad work, causing trouble for the weave room, than any other operative in the mill, unless it be the warper tender. I will not go into any details as to the condition in which the frame should be kept, only see that the creel, cylinders, and fronts are perfectly level and in line with each other. See that traps and drain pipes work freely so as to keep water out of the cylinders. Keep the cylinders packed in good shape with new packing. The friction should be taken down once a month, oftener if possible, and greased

*An address before the third semi-annual meeting of the Texas Textile Association.

†Superintendent Sherman Manufacturing Co., Sherman, Tex.

with tallow, then rubbed perfectly clean with waste. It seems to me that it would be a good idea to cover the rubber friction with cloth. It will add to the life of the frictions and prevent them from getting dry and hard. They should be lubricated often with graphite and oil. Whenever your frictions get hard so that you cannot bend them with your hands, you had better have them replaced with new ones. The old, hard friction will pull the stretch out of your warp and it will be brittle when it reaches the weaver. The loom needs all the elasticity the yarn has; and in warp preparation this should be one of the principal objects.

Another thing about slashing that needs careful attention is the squeeze rolls; enough cloth should be used on the squeeze rolls to give a good cushion; also about 3 yards of flannel. Keep the best roll in front and the edge of the flannel should be kept in good shape. Too much flannel on the squeeze roll will let too much size through and stick up the warps, causing them to run bad. I find that a blanket put on right gives good results for 6 or 7 weeeks.

Keep enough cloth on the tension roller, but not too much, as it will pull the yarn too fast. See that tension roller pulls uniformly with roller in the size vat. Do not use too much steam on the cylinders as this will bake the size on the yarn. I could go on multiplying the things that are necessary to be done in the slasher room until one is impressed with the fact that slashing is a very important factor in the preparation of the yarn for the loom. But I will not go farther as I wish to take up some time in the size making.

Size making, to my mind, is an art. In making size there is no set formula that a man can go by; we have so many conditions to contend with in the various sections of the country that it is impossible to have any set formula that would meet the requirements in every mill.

The main thing in making good size is to see that it is thoroughly cooked and by having a good starch and good water. When I say good water I mean a pure soft water, or fresh condensed water, for it is impossible to get the highest results out of other ingredients unless you have good water.

I am not going to say anything in regard to the proportion of the different ingredients to be used as I have heretofore stated that conditions are so varied in the different plants that no set of rules can be adopted. Each overseer or superintendent should find out what is best suited for his particular class of goods and then stick to it.

In making up a kettle of size, the first thing is to run whatever amount of water is required into the kettle, then put in starch and let run for about 10 minutes before turning on steam. Size should be cooked for at least ½ hour before any compound is put in, as the compound does not need to be cooked. Just here let me say, watch your sizing compounds closely. See that the compound is going to cause the size to penetrate the yarn, also if it is going to cause the yarn to hold moisture, thereby preventing the yarn from breaking in dry, windy weather, and finaly, see that it cuts all gum and keeps the cylinders clean, if not, when the yarn leaves the cylinder it will stick. This will destroy the gloss on the yarn and cause it to weave badly.

Cook the size for one hour or longer and cook slowly. There is no limited time to cook size for this reason. Sometimes you will have 150 pounds boiler pressure and then again you may have only 120 pounds. When the size thickens for the first time, cut off some of the steam and cook slowly. As the heart of the grain is much richer than the body it takes much longer to cook. After it thickens for the second time dip some up every few seconds on a paddle and rub between thumb and finger and when it becomes slick, smooth and clear your size is ready for use.

Whenever possible the circulating system should be used.

There are various ways in which to keep the size at the proper level in the size vat. This is very essential in producing even running warps and in keeping the weights correct in the cloth.

Keep the size boiling in the supply kettles and size vats while using. Do not be afraid that the size will get too thin, as the evaporation will offset the condensation.

Universal Reorganizes.

A new company under the name of the Universal Winding Co. has been incorporated under Massachusetts laws to take over the interests of the Universal Winding Co., organized under the laws of Maine, which has developed the winding machine business in the United States and the International Winding Co., also a Maine corporation which has developed the export business.

The present officers of the Universal Winding Co. will hold the same position in the new company and 95 per cent of the stock controlled is owned within the limits of the state.

To meet the constantly increasing demand for machines both for the home and foreign markets the plant of the Universal Winding Co. at Auburn, R. I., will be enlarged and additional machinery and tools are being installed.

The new Universal Winding Co. will be the largest in the world devoted to the manufacture of winding machinery, and, with the addition of several new types of machines, which are nearly ready for market, it will be in a position to meet the full requirements of the textile industry for the economical winding of fiber in process in the mills or for market distribution.

Professor Oewald Richter, an Austrian chemist, has discovered that a nettle fibre of high value for making textiles can be recovered easily and cheaply by the water-rotting process; that a rich yield of fruit sugar is thereby steeped from the plants, and that the stems make an excellent fodder.

He came to his discovery after some fifteen years of experimenting with ammonia solutions, only to find at last that the fibre could be separated by rotting the plants in water. It all depends, however, on knowing how to supply the water. Investigators had all along made the mistake of assuming that nettles must be rotted like flax; that is, they must be thrown into water and left there till he plants were sufficiently rotted to permit the separation of fibre and wood. But this method failed completely with nettles, for the rotting process attacked the fibre as well and destroyed it. Although the supply of wild nettles in Germany and Austria is practically inexhaustible, it is assumed that it will be necessary to cultivate the plant to get the best results. In that case practically the only expense will be to plant the fields once with roots of the wild nettle and harvest the crops in the next ten years, no further planting being necessary.

Dyeing, Bleaching and Finishing.

Reconstruction in Dyeing.

BY EDWARD S. CHAPIN.

PART 2.

Red tan on yarn. Mordant and dye in the usual manner. Mordant with 10 per cent. chrome salt D, and dye with 60 per cent. cutch extract and 15 per cent. fustic extract or aurantine paste. At the end of the dyeing operation add 1 per cent. tin crystals to the dyebath to brighten the shade, and boil fifteen minutes further. Develop in a fresh bath with 3 per cent. bichrome fifteen minutes at the boil. The mordant and dyebaths are not exhausted, and may be used again, strengthening with one half the amounts of chemicals and dyestuffs.

Yellow tan on yarn. The process is the same as recommended for a red tan in yarn, except that in the dyeing are used 50 per cent. cutch extract and 25 per cent. fustic extract or aurantine paste.

Braided with white cotton and boiled for one half an hour in a 10 per cent. soap solution, these tans do not lose in depth nor change in shade, in fact the resulting shades are on the same tone and richer, and interwoven white is unstained.

To brighten these tan results further, hypernic can be used instead of cutch. Following is a typical formulae for making a bright orange tan with hypernic and yellow:

Orange tan on yarn. Mordant with 10 per cent. chrome salt D, as usual. Dye with 50 per cent. fustic extract or aurantine paste, and 20 per cent. hypernic extract. At the end of one-half hour boil, add 20 per cent salt. Boil fifteen minutes, and add 1 per cent. tin crystals. Boil fifteen minutes. Rinse.

On account of the moderate fastness of hypernic to soaping, this bright tan does not possess the superior fastness of the straight cutch and yellow tans. Topping with chrome makes the results faster but dulls the shade. By using chrome salt D, to top, the dulling effect is reduced and the same extra fastness secured. By combinations of cutch, the yellows and hypernic, practically all the tan shades of the trade can be matched.

Bright blue on yarn. Mordant with 4 per cent. chrome salt D. Dye with 8 per cent. logwood extract and ½ per cent. methylene blue 2B.

Bright green on yarn. Mordant with 6 per cent. chrome salt D. Dye with 6 per cent. aurantine extract, 1 per cent. logwood extract, 0.6 per cent. methylene blue 2B.

Next comes the question of adapting the dyewoods to the machinery in use in the mills. The circulating machines are of special interest to the dyeing trade, and to color stock with dyewoods in such machines was the first problem to which we addressed ourselves a year ago. This has now been accomplished, and the processes worked out have been in practical operation in various mills for more than six months.

Before giving a general method for dyeing in circulating machines it will be advisable to add a little theory to the discussion. In dyeing yarn, the skeins can be entered at a boil, unless the apparatus employed is a pressure dyeing or circulating apparatus, when the theoretical considerations now to be advanced apply. The mordanting of cotton with chrome can only be secured by the use of a chromium compound in a peculiar state of equilibrium, or perhaps, I should say, arrested unequilibrium. The balanced big boulder on the hillside needs but a push to send it crashing down the hill; so the chrome salt D is in such a potential condition of unrest that it needs but the cotton and the boiling temperature to break it up and to cause fixation. At room temperature it is absolutely soluble and perfectly stable. The breakdown does not take place except at elevated temperatures, and not rapidly until the boil is reached. With circulating machines it is accordingly necessary to feed the chrome salt at a temperature much below the boil, and to raise the temperature slowly to the boil. By this means a slow even mordanting is secured on the fibre, and there is no precipitation at the bottom of the machine.

To use, pack the machine carefully. Boil out the cotton well for twenty minutes. Cool to 140 degrees F. Add the chrome salt D to about one half a barrel of cold water. Add to the machine in ten minutes. Raise to a boil slowly and boil three-quarters of an hour. Rinse carefully. It is essential to rinse thoroughly until rinse waters are perfectly clear.

Prepare a solution of the dyewoods in a large barrel. Use plenty of water, and boil to make sure of complete solution. The addition of the dyewood is the critical part of the dyeing, and it is essential that the dyewood be in thorough solution. Begin feeding the dye liquor at about 100 degrees F. The steam can be kept on while the dye liquor is being fed. Feed in ten to fifteen minutes. Bring to a boil, and boil one half hour. Add 20 per cent. common salt in ten minutes, and boil a further one half hour. Rinse.

This will ordinarily complete the process. For special effects as described in the various formulae for coloring yarn, it is sometimes necessary to treat the chrome mordanted cotton with other metallic mordants, as tin crystals, copperas or the like; and then again it is desirable to further develop or further fasten after dyeing with other treatments, using variously chrome, bluestone, tin crystals, or chrome salt. Wherever additional treatments are recommended it is essential to rinse very thoroughly after each operation, otherwise the cleanest and fastest results will not be secured.

The dyed cotton inclines to feel harsh. Accordingly it is advisable after the completion of the dyeing operation to soften. About 1 per cent. of any good softener, circulated for twenty minutes at 120 degrees, will give a soft feel to the stock, and ensure satisfactory spinning.

Another form of apparatus found now in all cotton mills is the rapid warp apparatus specially devised for coloring warps with sulphur colors. The use of chrome salt as a mordant on cotton in these rapid machines, has led and is leading to new and notable results. The action of chrome salt D in mordanting the cotton fibre is well-nigh instanta-

neous, so that if a warp is passed through a chrome salt D solution, even at a very rapid rate, it takes up enough mordant to act as a bottom for any of the natural or chrome mordant dyestuffs.

The shade on warps most desired from natural dyestuffs during the past year, next to black, has been blue. With the scarcity of indigo, only partially relieved by the Chinese importations and the increased importations of natural indigo, it was necessary to look to logwood for blues for denims, tickings and the like. For a long time the trade held out against the logwood blue on denims, but finally this was accepted.

The following method of dyeing a blue on warps for tickings with hematine was carried out in a three box washer. I believe it is the only method now known that gives a logwood blue on warps which does not stain the white in the making of the ticking. Each box of the washer contained 300 gallons = 2,500 pounds of water. The baths were started at a certain percentage strength of solution reckoned on the weight of the water in the boxes; during the passage of the warps through the baths enough of the materials was fed in to replace what was taken out of the solutions.

One set eight warps, 7,500 yards each, (2,700 pounds).

	Strength of Starting Bath.		Feed on Goods.		Wash Method.
	Per Cent.	Pounds.	Per Cent.	Pounds.	
Chrome salt D (boiling),	2.5	62.5	5	135	Cold
Copperas (cold),	.6	15	1.3	35	"
Hematine, 1st run (boiling),	1.2	30	4	108	Omit
" 2nd " "	0.6	15	4	108	"
Bluestone (150° F.),	0.6	15	1	27	Cold

One passage through the chrome salt D bath and one passage through the copperas bath performed the mordanting. After each, a running rinse with spray was given. Nips were set to squeeez well and uniformly. Two runs were given in the hematine bath; no wash between the hematine bath and the blustone bath. After passing through the bluestone bath, the warps were given a running wash with spray.

With two washers, economies may be effected by maintaining standing baths. Logwood extract will not do for this process; it is essential to have hematine of good oxidation. Interesting theoretical problems developed in the practical application of the chrome salt D to the dyeing of warps, but this cannot be at present discussed.

This method of dyeing warps has been successfully applied in coloring warps for denims. Repeated practical trials have shown that the process can be applied in a four box washer to equal, if not to exceed, the production of indigo warp or sulphur blue warp dyeing. Twelve warps of 5,400 yards each can be dyed in six hours.

This method of coloring warps for denims has the further interest that under ordinary times it would be of exceedingly low cost. The denim is not nearly so bright as an indigo denim and would accordingly suffer by comparison over the counter, but the cost of dyeing would be approximately one-half to one-third the cost of indigo dyeing. It is possible that by the use of a little methylene blue this deficiency in brilliancy can be overcome.

The chrome hematine dyeing process is a true dyeing process. The color is not deposited on the warps, as is the case with indigo. Accordingly, the denims resist household scrubbing. This has been demonstrated by practical trials. Overalls made from a chrome hematine denim were worn by the machinists of a well-known denim mill, and were examined after four household washings. The agent of the mill pronounced the result better than with indigo denims. This mill makes a high grade indigo denim. The chrome hematine denim is not so fast to soda ash as the indigo denim, and accordingly does not stand laundry washing as well as the indigo denim.

The chrome hematine dyeing process, unlike many of the older methods of dyeing logwood for blues, is not dependent on contingent conditions of oxidation. The color formation is a definite sharp reaction. The same color is always produced, and there is no variation in the shade of the warp. It required considerable study to prevent the warps from ending, but the only difference was then a difference in depth of shade; the tones were always identical.

The padding machine is a favorite in the cotton mills. Until recently no satisfactory method was known of coloring with natural dyestuffs by the padder; and it was a great triumph that certain of the artificial colors could be successfully colored on this machine. The thickness of the reaction of chrome salt D with cotton and natural dyestuffs led to the thought that here at last was a process which was especially suitable for the application in the padder of natural dyestuffs. This idea has now gone beyond the laboratory stage. Practical trials in a large way have given very satisfactory results.

Other instances could be given with detailed formulae of the adaptation of this process to other dyeing apparatus; but enough practical illustrations have now been described to show the foundation principles, which may be applied by the various mills to the working out of their own particular problems.

Fastness is where we faced with natural colors our greatest difficulty. Artificial colors have been perfected of very remarkable fastness toward such agencies, as acids, lights, chlorine, akalies and the like, and the use of such colors on an extensive scale has been woven into the very warp and weft of the industry. Well would it have been for the industry of the country if we had had a warning of the needs of the present situation, and had had a dozen years to study the processes of getting the fastest results possible from natural colors; for although in the past year there have been notable discoveries in fastening natural colors toward certain agencies, it still remains true that there are very many purposes of the trade which the natural colors cannot by any present known methods of dyeing be made to fulfill.

Yet here we must approach the subject with discriminating and intelligent judgment. The extra fastness of certain classes of artificial colors has led to the wide-spread impression that all artificial colors partake of the same general characteristic and are of exceptional fastness. As a matter of fact, for a great many purposes of cotton dyeing extra fastness is unnecessary, and accordingly the larger part of the dyeing in the cotton mills of the country has been done with colors of only moderate fastness. It is well within the memory of many when the "aniline dyes," as they were then termed, were regarded with suspicion by the trade because dyeing colors obtained from them, compared with the results from the old natural dyes, were not fast. As a matter of fact, dyes, to wit, the so-called direct cotton dyes, no faster than these first aniline dyes, in many in-

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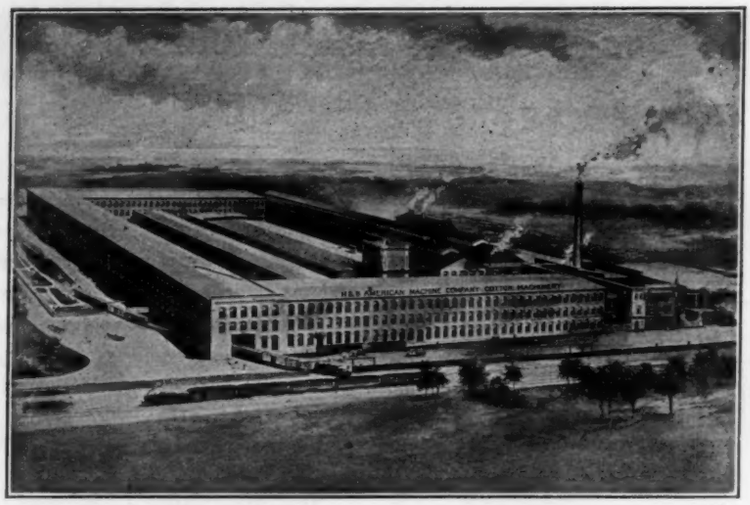

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PAWTUCKET, R. I.

stances not so fast, have for many years been the principal purchase of the cotton mills, largely because they could be dyed quickly and simply and could be used in processes and for fabrics where no special extra fastnesses were required. For such purposes the natural dyestuffs can readily be used, and in many instances the results from natural dyestuffs will be found to be faster.

Not a little of the reconstruction now needed is a reconstruction in the mental attitude of the buyers of colors and goods toward the term natural dyestuffs, and toward the question of what are, or are not, reasonable standards of fastness and requirements.

For certain purposes only one sort of fastness is required. A color may be notably unfast toward many agencies, and yet possess this one sort of fastness. Thus, a hematine blue dyeing is of exceptional fastness to soaping, yet of only moderate fastness to light. This blue could be used for many fabrics where soap fastness is the principal requisite, and where light fastness is not considered. Again a logwood black can be dyed of very excellent fastness to light, but will not stand vitriol cross dyeing. Such a black could not be interwoven with wool which is to be cross-dyed with vitriol, but could be used in fabrics in the making of which there is no mineral acid cross dyeing, but which have as their pivotal test light fastness. So for a logwood slate for lining work. Notably unfast to light, it resists hot wet-pressing and is satisfactory.

Natural colors can be dyed much faster than is commonly believed. The word artificial has been a fetish to conjure with, and it is only recently that American products and natural colors have had a fair hearing. For many years the word "American" or "natural" was sufficient to condemn a product or process in the thought of all too many mill and commission house men. They listened to claims of new processes, of improved fastness, and of special merit, with openly amused incredulity or ill-concealed contempt. In the past year many of these men have admitted that from natural dyestuffs can be secured results of a fastness or value they never before thought possible.

For many of the fastness requirements of the mills today it will undoubtedly be impossible to use natural dyestuffs or to work out even with exhaustive studies methods of dyeing by which the requisite fastness can be secured. Thus, hypernic dyed on a chrome salt D mordant, is only of moderate fastness to soaping and of inferior fastness to light. I see almost no means now of improving the hypernic results to give the perfect results we would like. Nature and natural law place limits to developments.

Another point which is reasonable and will help in the reconstruction is the question of right trade standards and tests. It is well within the knowledge of many in this audience when an acid test with concentrated oil of vitriol or concentrated muriatic acid was used as a means of discrediting logwood blacks. As a matter of fact this test has nothing to do whatsoever with the wearing qualities of a fabric; for ordinary atmosphere is somewhat different from oil of vitriol. It must be evident that the action of perspiration is not the same as that of concentrated muriatic acid. Nevertheless, we find today in the United States government specifications for khaki a concentrated muriatic acid test.

The khaki dyed with direct colors stands the muriatic

test, but is entirely destroyed by house washing or laundering. The khaki dyed with natural colors resists repeated launderings and household washings perfectly, but is destroyed by the muriatic acid test. The direct dyed khaki will not stand exposure to light and weather, while the khaki dyed with natural colors may be worn winter and summer in sunshine or rain with impunity. As a matter of fact, the khaki from natural dyestuffs withstands steeping in concentrated lactic and citric acids very well, and it would seem as if this was a satisfactory acid fastness. Unfortunately the khaki from natural dyestuffs, judged from the best results to date, resists chlorine only moderately. Where laundries use chloride of lime this is a defect; which defect, however, is shared by results from practically all dyestuffs except the vat colors.

It is a well-known fact that logwood and natural dyestuffs increase the weight of fabrics and fibers. This advantage is illustrated by the following incident. Last year a hosiery mill of this country was unable to obtain further and needful supplies of sulphur black, and started to dye their hosiery with logwood. The first results were almost like a board, and were decisively rejected by the commission house. The mill owner, however was fortunate in having an experimental turn of mind, and started to investigate the problems. He did not propose to close his plant down and stop earnings, if a little investigation would prevent it. So he started to experiment with the manufacture of his stockings. He knit his stockings more loosely, tied them more loosely, and thus brought to his dye house a flimsy looking and feeling hose. This was then dyed, with the result that a hose was secured which felt and looked almost identical with his standard goods formerly obtained from sulphur blacks. He sold his stockings by weight and found that he had enough extra weight to more than compensate for the cost of dyeing. He further found that the new method of knitting produced less seconds, and the operatives in the mill were able to turn out more work with less breaks.

For certain purposes outlined in this paper and in the paper of last year, the use of natural dyestuffs may prove temporary. The mills should and would return, if a full supply of artificial colors again becomes available, to the use of artificial colors for many purposes, particularly where the artificial colors can be dyed more simply or give special effects.

The reconstructions of the past year prove conclusively that the natural dyestuffs can and should be used for many purposes, hitherto not dreamed of, with profit to the industry. It is not too much to say that the impartial application of the new principles of dyeing that have been developed during the past year, will prove the basis of an even greater construction in the science and in the art of dyeing.

Textile manufacturers know that "looks go a long way." This is true in every branch of the textile trade, for that is what it depends on. The most successful manufacturers find that excellent results are obtained with sizing and finishing pastes made by The Arabol Mfg. Co., 100 William St., New York City. Their soluble sizing tallow combines readily with starches and at the same time acts as a softening agent. The scientific process by which it is prepared has obviated the objections usual to tallow sizes, such as odor and mildewed warps. It reduces shedding to a minimum, and gives a flat smooth fibre.

Dyestuffs Announcement.

In March last the Republic Trading Corporation was advised by the State Department at Washington that assurances had been received from Great Britain of non-interference with respect to two cargoes valued at approximately five million dollars, to be consigned to said corporation. Up to the time that this assurance was received Germany had declined to permit the exportation of any dyestuffs, but in April the embargo was raised and Count von Bernstorff notified our State Department that a total of 15,000 tons would be allowed out. Negotiations were thereupon opened up with Great Britain for the necessary arrangements to provide for the limited quantity stipulated in the British permit. Simultaneously negotions were also started with a view to procuring safe passage for the entire amount offered by Germany. Both of these negotiations with Great Britain have been conducted entirely through the State Department at Washington. On June 8th the German Ambassador to this country advised our State Department that there were ready for immediate shipment 2,000 tons out of the 15,000 tons which Germany had agreed to.

Here the matter stands.

The negotiations with Great Britain referred to above are still under way, but thus far without result. For some reason not readily understood, the safe passage indicated by the assurances received from Great Britain in March last have not as yet been accorded, and as this firm has repeatedly given their friends assurances that in the event that these diplomatic negotiations might fail, they would give notice thereof, they are making the above announcement in compliance with this promise. It now appears that the consumers of dyestuffs who are in need of goods of German origin are not likely to get them during the war unless further representations made to the Washington government by those whose interests are imperiled bring a change in England's attitude. As the situation stands today, the German goods are ready. Germany has removed the embargo and Great Britain has thus far declined to permit the shipment through the lines.

The Lectroflater.

The Lectroflater is a device for inflating tires and is an ingenious combination of a universal electric motor that will run on either alternating or direct current, a high pressure air compressor, a gear box and a condensing chamber so arranged that all elements are enclosed in a single housing, and are automatically cooled by a patented cooling system that requires no liquid of any kind. All bearings, gears and piston are automatically lubricated from a central source by the capillary system, there being no liquid lubricant or oil level to maintain, consequently, there can be no flooding and it is impossible for any oily vapor to get into the tires and rot them out. It will run from any lamp socket and will pump any size tire to the required pressure in a very short time. It eliminates the necessity for storage tanks, stationary compressors and heavy truck outfits around the garage. It is made in two models by the Black & Decker Mfg. Co., Baltimore, Md.

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Our inspector will pass upon the quality and quantity of materials and workmanship and see that the roof is laid so as to give maximum service. From the buyer's standpoint this arrangement is ideal. Under the plan he is assured of having an inspector on his roof whose only interest is to make it *as good as possible.*

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Notes About Men You Know.

STEPHEN C. LOWE.

STEPHEN C. LOWE, president and general manager of the Stephen C. Lowe Supply Company of New Bedford, Mass., recently resigned his position as selling agent of the Whitin Machine Works, with whom he has been connected for the last two years. Hereafter he will give his whole time and attention to his mill supply and specialty business. Mr. Lowe recently purchased a residence in Fairhaven and will reside there in the future, giving up his Boston office. Prior to going with the Whitin Company, Mr. Lowe was sole agent in this country and Canada for John Hetherington & Sons, Ltd., Manchester, Eng., for many years, but he has always retained his interest in the S. C. Lowe Supply Company, which he organized 33 years ago.

SCOTT MAXWELL, agent of the Indian Head Mills, Cordova, Ala., is slowly improving from the effects of his recent illness, and it is hoped that a complete rest from business cares will restore him to his usual good health. Mr. Maxwell recently retired as president of the American Cotton Manufacturers' Association, and has a host of friends both North and South.

CLIFTON CORLEY, vice-president and general manager of the Necronsett Mills, Inc., at Cumberland, N. C., spent several days in Atlanta recently on a cotton purchasing trip. On the return trip Mr. Corley attended the Convention of the North Carolina Cotton Manufacturers' Association at Wrightsville Beach.

GEORGE E. WALLS of Fitchburg, Mass., has accepted a position as overseer of carding for the Dominion Textile Co., Ltd., Montreal Canada.

M. E. STEVENS, who recently resigned as agent of the Mississippi Cotton Mills at Morehead, Miss., is located in Mississippi as representative of a large mill firm of New Orleans.

J. F. MIMMS has resigned as carder and spinner at Mill No. 1, Fort Mill, S. C.

M. M. COGGINS has accepted the position of overseer of spinning at the Loray Mills, Gastonia, N. C.

C. H. GOODROE has resigned as overseer of carding at the Hamburger Mills, Columbus, Ga., to become assistant manager of the Standard Cotton Mills, Cedartown, Ga.

WALTER NEWBOLD WALMSLEY, who was recently named General Manager of the Alabama Power Co., at Birmingham, Ala., to succeed F. H. Chamberlain, resigned, has had much experience in handling large construction and development work both in the United States and South America. For ten years he has been engaged in handling a big proposition in South America, and about fifteen years ago he spent two years in Alabama in railroad construction work, at which time he acquired a splendid knowledge of the state. He is a graduate of Rose Polytechnic Institute. He was induced to become general manager of the Alabama Power Co., following the resignation of Mr. Chamberlain through the personal work of President Mitchell of this company who was a college mate of Mr. Walmsley at the Rose Polytech.

J. H. TURNER has become overseer of carding at the Bloomfield Mills, Statesville, N. C.

R. D. MCCURRY has become master mechanic at the Woodside Mills, Greenville, S. C.

W. R. FOWLER has resigned his position as overseer at the Hetrick Mills, Walhalla, S. C., to accept a similar position at the Roseneau Mills, Tuscaloosa, Ala.

JOHN CROMER of the Central Mills Sylacauga, Ala., has accepted position as overseer of carding at the Hamburger Cotton Mills, Columbus, Ga.

T. W. HARVEY, who recently resigned as superintendent of the Mellville and Cherryville Mills, Cherryville, N. C., has accepted a similar position at the Harden Mfg. Co., Worth. N. C.

A. H. MCCARRELL, formerly superintendent of the mills at Bath and Clearwater, S. C., has been promoted to general superintendent of the Alice and Easley Mills, at Easley, S. C., Easley Mills No. 2 and 3 at Liberty, S. C., Franklin Mill, Greer, S. C., the Lois Mill, Douglasville, Ga., and the Hartwell (Ga.) Mills.

G. E. NEISTER has resigned as superintendent of the Anna Cotton Mills, Kings Mountain, N. C., in order to give more attention to the Pauline Mills, which he owns.

MANUEL STEVENS, of Alabama City, Ala., has accepted the position of overseer of spinning at the Louisville (Ky.) Cotton Mills.

GEORGE LEE, formerly night overseer of carding at the International Braid Company, has resigned and accepted the position of overseer of carding at the Nottingham Mill, Providence, R. I.

A. R. DICKENSON of Atlanta, Ga., southern representative of Lockwood, Greene & Co., has been appointed man-

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ager of the Wateree Mills, Camden, the Winnsboro Mills, Winnsboro and the Moultrie Mills, Edgefield, S. C., all of which are now controlled by Lockwood, Greene & Co.

D. F. POOLE has resigned as overseer of weaving and designer at the Poe Mfg. Co., Greenville, S. C., and accepted a similar position at the Aiken Mfg. Co,. Bath, S. C.

IRVING SOUTHWORTH, agent of the Dover, N. H. branch of the Pacific Mills, is now general manager of the four mills in Columbia, S. C., purchased by the Pacific Mills from Lockwood, Greene & Company, and formerly a part of the Hampton Cotton Mills.

J. H. HUFF has resigned as overseer of No. 2 spinning at the Woodside Mills, Greenville, S. C., to become assistant superintendent at the Enoree (S. C.) Mfg. Co.

ALBERT J. OWLER, formerly overseer of carding at the Nottingham Mill of the B. B. & R. Knight Co., Providence, R. I., resigned his position on July 1st to accept a similar position with the W. S. Libbey Co., at Lewiston, Me.

L. W. KING of Lancaster, S. C., has accepted the position of overseer of spinning, spooling and warping at the Darlington (S. C.) Mills.

R. F. FISHER, McAddeville, N. C., has accepted position as carder and spinner at the Falls Mfg. Co., Granite Falls, N. C.

JOSEPH L. PERRY of New Bedford, Mass., has accepted a position as superintendent of the Jenckes Spinning Co., Pawtucket, R. I.

R. T. OSTEEN has been promoted from second hand in No. 3 weaving to overseer of No. 3 and 4 weaving at the Poe Mills, Greenville, S. C.

A. R. CHAFFEE of Anniston, Ala., has accepted position as carder and spinner at the Yazoo (Miss.) Yarn Mills.

JOHN ARCHER, overseer of spinning for the Wellesley Knitting Mills, Newton Lower Falls, Mass., has resigned his position with that company.

D. W. LEAGUE has been promoted from second hand in No. 2 weaving to overseer of No. 1 and 2 weaving at the Poe Mill, Greenville, S. C.

GEORGE F. PAYNE former superintendent of the Clipper Mill of the Mount Vernon-Woodberry Mills, Inc., Baltimore, Md., was recently presented by his former employees with a beautiful, diamond set, 32nd degree Masonic ring as a token of their esteem. The presentation was made by Asa Tydings, and Mr. Payne responded with much feeling, expressing his regrets at leaving them, and hoping at some future time to be able to shake the hand of good fellowship which was offered him on his departure. Mr. Payne has been very active in the welfare of his employees. He was a member of the house council at the West Park recreation center for two years, and, as such, was one of the prime leaders of the movement to establish the community Christmas tree for the children of his employees, and to send out baskets to the needy families on Christmas day. About three years ago, there was an inter-mill basketball league organized through Mr. Payne's personal efforts. Mr. Payne leaves his present position with the good will of the management and employees alike, to take a larger and more responsible position in another state. He carries with him the very best wishes of all who have come in contact with him in Baltimore.

JOSEPH WILMOT, instructor of weaving and warp preparation at the Lowell Textile School, Lowell, Mass., has accepted the position of assistant superintendent at the plant of the Bay State Cotton Corp. in the same city.

FRED H. HEAD from Caroleen, N. C., has accepted the position as night overseer cloth room, Clinchfield Mfg. Co., Marion, N. C.

R. H. SMITH of Spartanburg, S. C., has accepted position as night carder and spinner at the Mississippi Cotton Mills, Morehead, Miss.

J. C. TIDDY has accepted the position of overseer of carding and spinning at the Holt-Morgan Mill, Fayetteville, N. C.

BERNARD F. KELLY has resigned as paymaster for the Home Bleach & Dye Works, Pawtucket, R. I., to look after his interest as agent of the Central Warp Co.

W. L. BOYD has resigned as superintendent of the Harden Mfg. Co., Worth, N. C., and accepted a similar position at the Gambrill and Melville Mills, Bessemer City, N. C.

KENNETH MOLLER, until recently assistant treasurer of the Jenckes Spinning Company of Pawtucket, R. I., has been elected a director of the new Katama mills, Lawrence, Mass., and has become associated with the Boston office of the William Whitman Co.

W. FRANK SHOVE, treasurer of the Pocasset Manufacturing Company, Fall River, Mass., will represent the Watuppa Reservoir Company on the new commission for the improvement of the Quequechan river. He was elected at the annual meeting of the company at the office of the Pocasset Manufacturing Company.

J. B. PARKER has resigned as overseer of spinning, spooling and warping at the Eva Jane Mills, Sylacauga, Ala., and accepted a position at the Bibb Mfg. Co., Columbus, Ga.

J. H. GARDNER has resigned as overseer of spinning at the Martel Mfg. Co., Egan, Ga., to accept a similar position at the Trainer Spinning Co., Chester, Pa.

W. T. Whisenant of Gastonia Mfg. Co., Gastonia, N. C., has accepted the position of overseer of spinning at Maiden Mills No. 2, Maiden, N. C.

ARTHUR BURTON, for the last three years in charge of the mule spinning department of the Warren (R. I.) Manufacturing Co., is now superintendent of the Butler Mills, New Bedford, Mass.

L. G. HOOPER, overseer of carding at Flint Mill, Gastonia, N. C., has succeeded W. C. Withers as overseer of spinning at that mill.

J. T. ALEXANDER, of Concord, N. C., has accepted the position of overseer of No. 2 spinning at the Maginnis Mill, New Orleans, La.

J. P. SCOTT of Barnesville, Ga., is now master mechanic and chief engineer at the Walton Mills, Monroe, Ga.

ALPHONSE THIBAULT, overseer of weaving for the Pocasset Manufacturing Co., Fall River, Mass., has resigned. Mr. Thibault has been acting as superintendent during the illness of Robert J. Belcher in addition to his other duties.

W. L. HEFFNER, formerly with Maiden Mills No. 2, has accepted the position of superintendent of the new Carolina Cotton Mill, Maiden, N. C.

M. CROLLEY, of the Olympia Mills, Columbia, S. C., has become overseer of spinning at the Palmetto Mills, of that place.

J. W. ENGLE, of Birmingham, Ala., has become overseer of carding at the Edenton (N. C.) Cotton Mills.

E. S. DUNN has been promoted from second hand to overseer of spinning, spooling and warping at the Eva Jane Mill, Sylacauga, Ala.

A. C. PENLAND of Greenville, S. C., has accepted the position of overseer of spinning at the Cabarrus Mills, Kannapolis, N. C.

T. M. WALKER has been promoted from overseer of winding to overseer of spinning at the Orangeburg (S. C.) Mfg. Co.

J. R. PUCKETT has resigned as overseer of carding at Edenton (N. C.) Cotton Mills to become night carder and spinner at Wilson, N. C.

Practical Problems Discussed by Cotton's Readers

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so indorsed. This department is open to all. Suitable letters are paid for in cash.

Spoolers and Twisters.

EDITOR COTTON:

The spooler is a very simple machine, and used only to transfer the yarn from a small bobbin onto a large spool. The object of this is to increase the length of the yarn so as to make it possible to run a full section beam on the warper without changing the spools during the set.

However, a great mistake can be made in the operation, which is in the speed of the spindle. More work of a better quality can be produced with a speed not exceeding 750 revolutions per minute, than at a speed around 825 revolutions per minute, as found in some mills at this writing.

Why this high speed? (1) With such a high speed, no tender can tend 100 spindles and keep every end up. (2) It takes a tender a long time to get accustomed to such a high speed when hired from any other mill.

Where two or more ends are wound together in a form as is suitable to be placed on the creel of a twister, then two distinct types of machines can be used: (1) the drum double-winder, for winding two or more ends from bobbins or cops on a double-headed spool; (2) the quick-traverse or cross-winding double-winder, as it is sometimes called, this winds from cops, ring bobbins, skeins, or spools, either onto a paper tube in cylindrical form, better known as a parallel tube, or else onto a cone shaped form of a cheese, also known as a conical tube. This cone shaped form, is very seldom made for twisting purposes.

The twisting process may be performed on various types of machines, depending of course on two factors: (1) the condition of the yarn when it is being twisted; (2) the method employed to insert the twist. There are two conditions in which the yarn is twisted, wet and dry, thus we have the names of the two types of machines, dry-twisters and wet-twisters.

Yarn may be twisted on machines involving three methods of inserting the twist. (1) By the use of a frame with spindles, rings, and travelers on the principle of a ring-spinning frame, which is known as a ring-twister. This is the most common type of twisting machine used. (2) By means of spindles and flyers on a machine, which is known as a flyer-twister. (3) By the use of a machine constructed on the mule spinning principle, which is known as a twiner.

There are other points of difference in the various methods of twisting which are the forms in which the single yarn is delivered for twisting and also the forms in which the yarn is removed from these machines. Yarn may be twisted from cops, spinning bobbins, parallel tubes, double-headed spools, taper-wound spools, and, less frequently, conical tubes. It may be twisted onto double-headed twister bobbins, or single-headed twister bobbins, these being either warp or filling wind, or cops.

As ply-yarns are used for innumerable purposes, different combinations of processes, varying constructions of machinery, and varieties of forms, from or to which the yarn is twisted, are necessary; this, as most readers know, gives a very large variety of organizations for twisting plants.

The writer has here some of the most common and simple arrangements, they are as follows: (1) Twisting from cops or either spinning bobbins directly to the twister bobbin at one process; (2) Spooling to double-headed spools and twisting from these to the twister bobbin; (3) By winding two or more threads onto a parallel tube at the double-winding machines and then twisting directly onto the twister-bobbin; (4) Twisting from spinning cops onto a twiner cop. Of these arrangements, the first three are used in connection with the ring and flyer-twisters, while the last one is most commonly adopted when the twiner is used.

The machine that is most commonly used for twisting is that which is known in America as a ring-twister, and in Great Britain as a doubling-frame or doubler. The object of the twister is to form the ply yarn by inserting a sufficient amount of twist in the required direction, and to wind the resulting yarn on a twister-bobbin. Where the process of double-winding is omitted, the work of doubling is performed at this machine, by taking the required number of ends from the individual bobbins or spools that are in the creel, and twisting them together. In this manner two or more ends are twisted.

When the spools from the double-winding machine are used, most always the yarn from one spool is taken to form the ply yarn or thread; since in this manner it contains the correct number of ends laid together, but without any twist inserted. It is, of course, possible to take ends from two or more double wound tubes, as for example, when making 4-ply yarn, we could and can take two ends and wind them on one tube, then take two more and wind these on another tube, and then conducting them together to make a 4-ply yarn, but this is not so commonly done, nor is it as satisfactory as to wind the required number of ends on one tube, if the number required is not excessive.

The principle on which the ring twister is constructed

and operated is to pass the yarn between rolls and twist it by passing it through a traveler that is revolving rapidly around a ring, by means of a rotating spindle carrying a bobbin, the difference between the circumferential speed of the bobbin and that of the traveler causes the twisted yarn to be wound on the bobbin.

The twister, in general appearance, resembles the ring spinning frame, a large number of parts and motions of which are duplicated on a twister. Ring twisters for both wet and dry twisting are alike in construction, with the exception that in the case of the wet twister the yarn immediately before being twisted is moistened by being passed through a trough containing clean water.

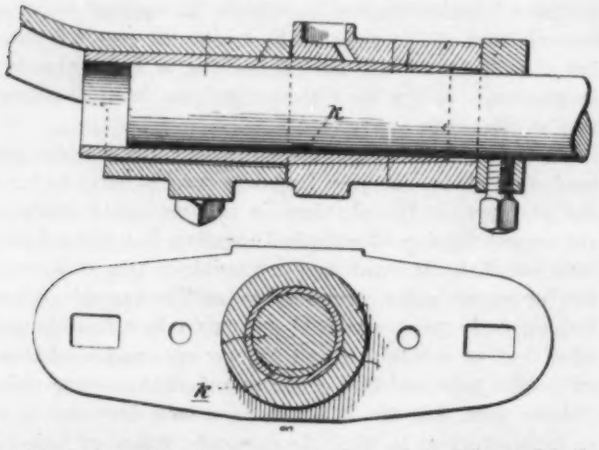
These troughs should be cleaned about once a week at least, and one thing that the writer wishes to point out and explain is, *do not* allow any twister-tender to pour water into the trough while the frame is in motion. The result of such an action is that a sort of a pulp-like substance that adheres to the bottom of the trough after a week or ten days and, if not washed out, will, when the water is poured in (while the frame is in motion) cling to the ends as they pass through the water and run onto the bobbins. This is bad practice and care should be taken in filling the troughs with *fresh* water.

M. Lewis (Mass.).

An Adjustable Rocker-Shaft Bearing.

The Clinton Cam Company at Clinton, S. C., who has come into prominence through the introduction of the Casey cam patch, for repairing worn cams on looms and aiding in balancing the cam shaft, thereby reducing the shock from the pick balls and making the loom run more smoothly, is now preparing to place on the market a new device known as the Roy adjustable rocker-shaft bearing.

They claim this invention will do as much for the rocker shaft as their earlier device has done for the cam. This invention—two views of which are shown in the cut—consists of a sleeve which is slipped into the bearing and fastened to the shaft with a set screw. It is claimed that no matter how badly the shaft has been worn, it will thereafter run true. Whenever this sleeve becomes worn, the set screw may be loosened, enabling the sleeve to be readjusted and providing a new wearing surface for the shaft. This device will be offered in two models, one of



which is intended for a new shaft, and in this model the lost motion and wear automatically adjusts itself in the take-up. The illustration shows only the device intended for repair work purposes. It is claimed by the inventor that the worn space in the shaft shown by the dotted lines at K forms a cavity between the surface of the shaft and the interior of the bushing which has been found in practice to be of advantage by serving as a grease chamber.

Bobbin-Lead Vs. Flyer-Lead.

EDITOR COTTON:

I read with interest the replies of "A. B." and "Wash" in March issue giving them due consideration. "A. B." said he was sending another letter to prove we had gone from bad to worse in the change of the system, but I have not seen it. He also says that the cone belt is holding back the speed of the bobbins. It would seem from this statement that the bottom cone has a tendency to be driven by some other mechanism than the cone belt and it was acting as a friction to the cone to prevent it from revolving too rapidly.

Owing to the peculiar construction of the compound it is possible to have the flyer or bobbin to lead. The sun gear is driven by the bottom cone on both systems, which decreases or increases the speed of the bobbin in proportion to that of the flyer. And the cone belt is at all times a driver to the bottom cone and never a friction in any manner, as "A. B." would have us conclude. The frame shaft imparts requisite motion to the bobbins as well as to the spindle in either system, and the excess or reduced speed of the bobbins over that of the flyer is derived from the bottom cone, its connections to and through the sun gear to the sleeve gear, all working in combination. So any one can see that "A. B." has submitted but little proof and is on the wrong track and should get right. Also his failure to run his frames full any time of the year from January to December is not because the frame is a bobbin lead, as he stated in the December, 1915, issue of COTTON. He should locate the cause and remedy it at once.

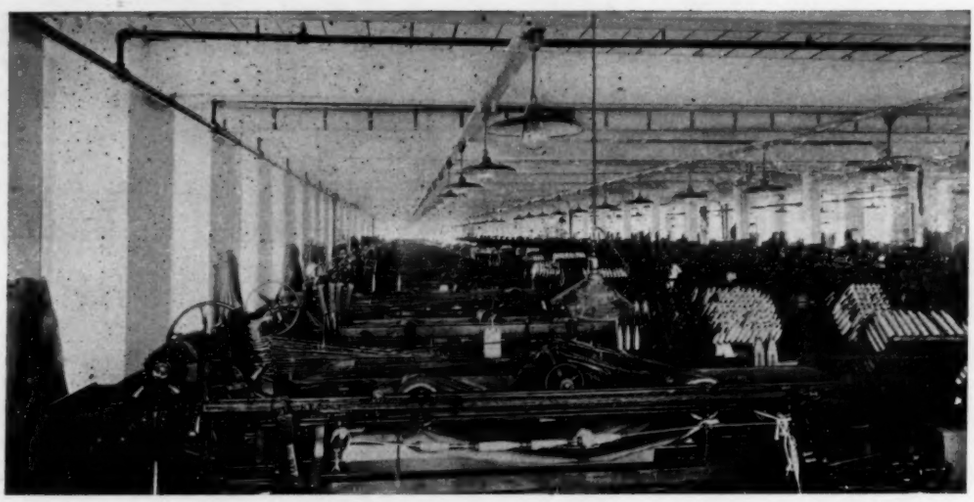
I believe that "A. B." and "Wash" can not or will not find the trouble. Had they got down to business, and if necessary donned a pair of overalls, they would have long ago found the cause somewhere in the stock, wear and tear, or some improper adjustments in the various parts of the machine, and not directly or indirectly to the frame being a bobbin-lead. Therefore, I said "examine the man," for there is where the trouble lies.

Some may think this is putting it somewhat strong, but in order to master fly frames and make a good, uniform strand of roving that will spin, it takes many years of hard work and serious study to find and adjust the various faults in machines and condition of stock.

"A. B." further asks which has the best speed reducing motion, the new differential motion or the Houldsworth motion. There is very little difference in the speed reducing value of either differential; while the advantage is in favor of the improved motion, which slightly reduced the power required to drive the bobbins and which assists the bottom cone and cone belt, this is not as much as "A. B." and "Wash" would have us think.

"Wash" says I gave little of value pertaining to the merits of either system, but simply took a fling at "A. B." and others. It was not my intention at that time to discuss

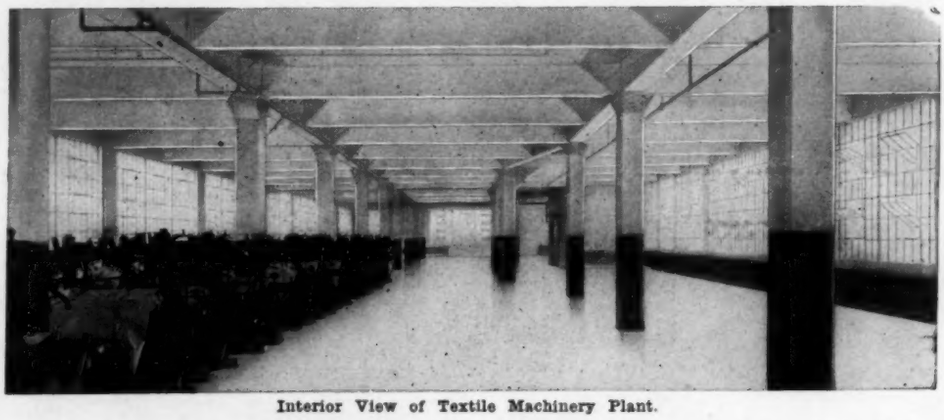
CHAFFEE'S MILL WHITE MAKES DAYLIGHT



Interior View of Worsted Mill.

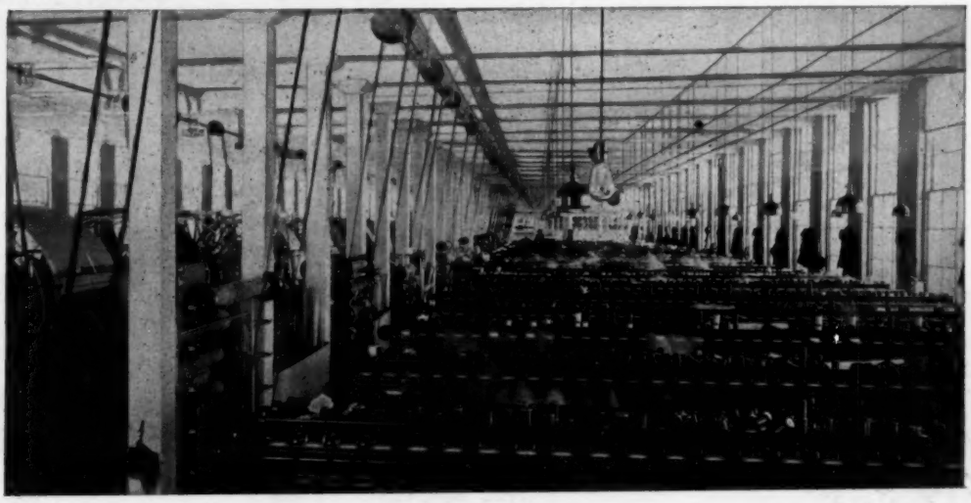
CHAFFEE'S MILL WHITE

A PERMANENT, LIGHT-DIFFUSING PAINT FOR THE FACTORY INTERIOR
ADDED LIGHT—LOWEST ULTIMATE COST—SANITARY FINISH



Interior View of Textile Machinery Plant.

Wouldn't it pay you right now to investigate the merits of this Sparkling, Shadow-chasing White Paint, which has proven its efficiency in hundreds of the largest mills? What we have done for others we can do for you.



Interior View of Silk Mill.

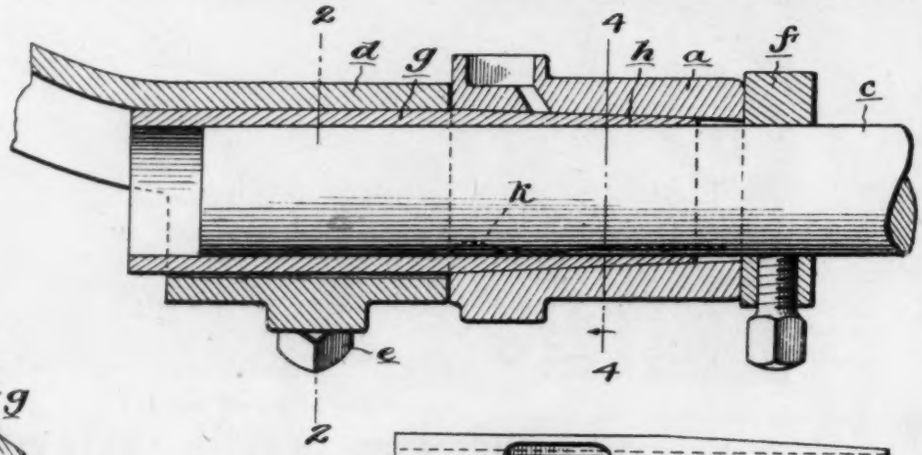
WRITE TODAY for Descriptive Booklet and Paint Panel

Thomas K. Chaffee Co. Providence, R. I.

CHAFFEE'S MILL WHITE MAKES DARK CORNERS LIGHT

THE ROY ADJUSTABLE ROCK SHAFT BEARING WILL SAVE TIME AND MONEY

MODEL "A"



Pastented June 13, 1916.

CLINTON CAM CO.
CLINTON, S. C.

...t his career depends upon such knowle...

Some time ago I took hold of a plant in which was an 18x42 Corliss engine and two 72-inch tubular boilers. The plant, including the shafting, was in very bad condition. After putting the machinery in as good condition as circumstances would permit, I found I was burning two tons of bituminous coal a day, costing $4.38 a ton. By installing mechanical draft I was able to use coke or anthracite screenings of which about the same amount was used, but at a cost of $2.00 a ton. This I continued as long as I remained there.

It was an economical power plant, all things c...

and there's no better mechanical draft apparatus than Peerless Blowers

PEERLESS Blowers are extensively used in hundreds of power plants throughout the country for producing mechanical draft, and Uncle Sam uses them on the U. S. S. "Minnesota" as well as other ships.

Catalogs Nos. 65 and 67 show our complete line of blowers. Write for them today.

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BUILT RIGHT RUN RIGHT

the merits or demerits of either system further than to show "A. B." that there was a defect somewhere and it was not because of the fact that the frame was bobbin-leading. "Wash" also says I have a task on my hands if I intend to prove "A. B." wrong, and he advises me to stick to my present job, all because I stated I could run my frames to a full doff at all times, and that I was using the bobbin-lead frames. He says further that he has been compelled to often doff his frames off during the summer months before the bobbins were full, owing to the bobbin-leading, and that the readers of COTTON will give him credit for knowing something about fly frames. I do. But surely "Wash" does not expect any praise for this statement about his frames which he made in the March number. I have been reading his articles on flyer-lead frames for the past three years, and he has written some good ones, still I cannot see why his suggestions are not used by both cotton mill managers and builders of fly frames to correct this grave mistake he claims has been made in the change of the system, for the bobbin-lead frame has the preference by most mill men and builders of fly frames in this country and, I think, in England.

In answer to my question why more flyer-lead frames were not used in this country, "Wash" says, "At that time the few men who knew that different hanks, speed, stock and type of flyers affected the true outline of the cones were in the minority. I presume he means by "that time." in years gone by when the change was made. Does he realize from the question, that I meant *now, the present day, and not a quarter of a century or more ago,* when the change of systems was made?

Now, in regard to his reasons, I cannot see where his idea is derived from for different hanks, speeds, stock, type of flyer, etc. Also the outline of the cones is the basis of consideration in frame construction at all times and is taken care of by the different gauges, alteration of the various change gears on the machine, etc. About his offer of a $5.00 check for a satisfactory answer to any one who could explain *why or how any hesitation of the bottom cone would cause stretch,* I will make no effort to get his check, as I think that *any hesitation of the bottom cone would cause slack.*

Still the flyer-lead frame makes stretched roving and for this cause, it was discarded more than any other reason, and the bobbin-lead adopted and I believe has given satisfactory results over the other system. He says further that I make the confession I have a great deal to learn about fly frames when I said I have no stretched roving on my frames. I will admit I am not out of the ordinary or an expert around the fly frame, and I think "Wash" is in the same boat, and makes the same confession when he has to doff his frames before they get full on account of the bobbins leading. Also when he says stop any bobbin lead frame, raise the bobbin and turn it one-half or a whole turn back so as to make the end very slack, start up the frame and this slack is taken up immediately, and then asks what takes place in the other ends? He answers, stretch! Here he admits conclusively that he is running the tension on his ends exceedingly tight, even to the stretching point, or that slack he speaks of, at the normal working speed of the frame, would require one-half to one and one-half minutes to be taken up with the proper tensions on the ends. Moreover, by examining the roving on this special end at this place, it will be found to be wound on the bobbin in a very compact form, also making a weaker strand of roving. Again, by making this end very slack it will be seen to form into a loop and thus wind onto the bobbin, showing beyond a doubt that the bobbin has no tendency to properly wind on the roving faster than it is delivered by the front roll under proper tension. Therefore it would not cause stretch unless the tension on the other ends was severely tight.

He says in the flyer-lead system the flyer revolves at a greater speed around the surface of the bobbin. And so is pulling the load, while in the bobin-lead system, the load is on the bottom cone owing to the bobbin having an excess speed to that of the flyer. Is this correct? I don't think so. Referring to the Houldsworth motion, the frame shaft gear transmits motion through the two bevel gears to the sleeve gear with the bottom cone down or raised. Anyone doubting this may leave the cone down so as to cause the sun gear to revolve, then *loosen the frame shaft gear set screws* so it will be free on the shaft, although still in mesh with the bevel gears, start the frame, and if any motion is imparted to the bobbins I would be pleased to know where it comes from. "Wash" has a task on his hands if he tries to prove otherwise, for in the flyer-lead while the bobbin is placed on the spindle and rotates on the same center as the flyer, it is specifically driven by an entirely separate mechanism. The cones in both systems are essentially governors, but in the bobbin-head system the winding revolutions of the bobbin is derived from the cones, and they do not carry the entire load.

"Wash" asks why the Houldsworth motion has its sun gear contain 100 to 120 teeth and its more recent substitute only contains 30 to 36 teeth? What effect has this on the bottom cone? It is this: All gears on the jack shaft run in the same direction as the jack shaft. The bell wheel having some less revolutions than the jack shaft, it causes some friction by its being loose on the jack shaft, and this friction is a decided help to the bottom cone, because it has a tendency to carry the bell wheel with it, making it somewhat easier on the cone belt than the Houldsworth motion. However, when Fay H. Martin placed the compound sleeve between the jack shaft and the compound, this friction was practically overcome from this one fact; the shell being held positively stationary by the jack shaft box, the shaft revolving within and the compound on the outer surface, there could be but little if any friction caused by the opposite direction of motion between the shaft and the sun gear, for each is on its own bearing, not one upon the other, as in the former case.

In regard to which system holds the twist most at the termination of the presser paddle. I have never given this one question much consideration, so am not prepared to discuss it, for it is a non-essential point in frame management. I notice in the April issue that William Shaw stated that the bobbin-head frame does hold the twist most at the termination of the presser paddle.

R. W. A. (Ala.)

F. R. Blair, formerly secretary, treasurer and sales manager of the S. K. F. Ball Bearing Company, Hartford, Conn., has resigned and has become president of F. R. Blair & Company, Inc., with offices at 50 South Church Street, New York City. It is understood that Mr. Blair is engaged in developing motor efficiency devices.

Setting the Feed Plate and Mote Knives.

EDITOR COTTON:

The setting of the "lack" on cards is a part that often times does not receive the attention that it should. By the "lack" I mean the feed plate and mote knives. Many carders are over cautious in setting these parts. I believe, and have tested this on all stocks from ¾ inch to 1 9/16 inch, that close settings are the best in all cases.

The main objection seems to be the fear of injury to the fibre. Except in cases of extremely long staple, the teeth of the licker cannot strike the cotton in such a way that it will injure it at all. The surface speed of the licker is great enough so that each fibre gets almost into individual action from the teeth to the licker. The teeth comb the fringe of the lap in such a way that injury to this is impossible, but the proper action cannot be obtained unless the lap is held firmly against the lickerin. The bite of the feed roll is far enough away to allow the licker to draw the cotton from the edge of the lap easily and without breaking it. By close setting the cotton is carried along by the teeth of the licker in a very fine even manner. If the setting is too loose, the cotton is not held firmly and goes through in bunches. Very small bunches but detrimental to the work just the same. I have found the average setting for a feed plate to be about a 9 or a 10 gauge and have found them as loose as 12 and 17. I have had the best results from a close 5. I have worked for men who were horrified at a setting as close as that, but in most cases have won them over to my way of thinking.

The mote knives are also something that many carders do not set close enough. I have tried experiments on cards having one, two, and three knives. Personally I prefer the three, but as most mills are equipped with two, I will use them for an example. I have talked with several men and they all say, "Set the top knife to a 17 and the lower one a little closer." That was the way I was taught but have changed my views considerably since then.

The two main objections to close setting at this point are fear of injury to machine and too much waste. The danger of hurting the knives or licker is slight if carefully set. The extra waste is small and will consist chiefly of bits of seed, etc.

I would like to have some of the readers of this department try this, and trust it will improve their carding as it has mine. Take a card and set the feed plate to a 5 gauge. Then set *both* knives as close as possible. The best way to do this is by ear. Set them close enough so that a touch will make them sound. Try this as an experiment and I think it will improve the work. Carder. (R. I.)

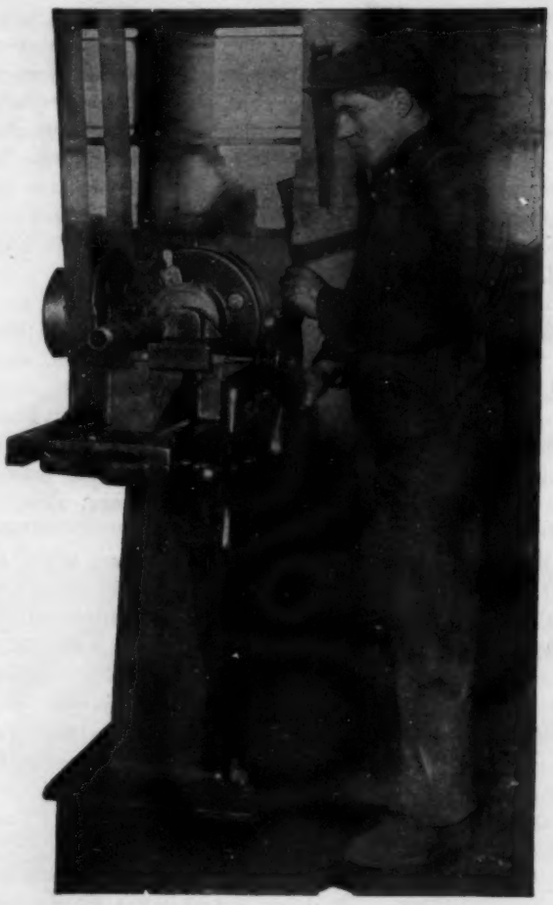
Bearings That Make Oil.

A unique illustrated booklet has just been issued by the S. K. F. Ball Bearing Co., Hartford, Conn., showing the use of ball bearings in the manufacture of cottonseed oil. A brief history of the cottonseed oil industry is given and the 38 pages of the booklet each carries a photographic representation of the cottonseed or some of its by-products in the course of its passage through the oil mill. It also shows very interesting applications of the S. K. F. ball bearings to the various machines of the oil mill. A copy will be sent free on application.

That Necessary Evil, the Repair Shop.

Every cotton mill has to have its repair shop. It is frequently looked upon by the mill manager as a nuisance and a non-producer, but it is acknowledged to be a necessary evil. Because of this feeling it is usually tucked away into some corner of the establishment that would be difficult to utilize for other purposes, and the amount of space allowable, cut down to the smallest possible limit.

One of the most common jobs done in the mill repair shop is pipe threading. The power plant, the heating system, the humidifying system, the slasher system, the drinking-water system, the sprinkler system, and a thousand and one other small jobs around the plant call for pipe threading and pipe repair work.



The machine illustrated herewith, is made in several sizes to handle pipe threading and bolt cutting work of all descriptions. It occupies the minimum of space, but is handy, convenient and business like. It is made by the Oster Mfg. Co., 2068 East 61st St., Cleveland, Ohio, who will send post paid on inquiry an interesting booklet entitled, "Actual Pipe Threading Experiences." This booklet also contains the complete Oster catalogue and carries a full description of the various pipe threading apparatus manufactured by them.

The man who behaves himself because he is afraid of the Police and the Devil doesn't make the best citizen. The best citizen is the man who behaves himself because it makes him feel good to be able to look the world straight in the eye.

A Cause of Spinning Trouble.

Editor Cotton:

I have had the opportunity of visiting many cotton mills, and at this writing I find some in trouble, simply because they are spinning yarn that is too fine for the cotton used. Many mills have recently changed from 27.50's to 29's yarn made out of one-inch American cotton. For warp yarn, we know the limit has been reached when 28's is made on ordinary upland cotton. When the warp yarn is made lighter, and the work begins to run badly, it should be evident to the manager that it is a waste of money to continue under such conditions, and the only way out of it is to change back, and as quickly as possible. Instead, some managers feel a certain pride, and before they will confess that they are wrong, they will allow the spinner to struggle under such conditions. This is not only unfair to the spinner, but absurd to demand that 29's yarn be made from one-inch ordinary cotton which will break at the standard weight.

The warp yarn is made lighter for various reasons. In order to save a few cents in the mule room, some lose three times as much in the spinning room in waste and production.

In other mills, this is done because there is a shortage of filling ring spindles, and by making the warp lighter, the filling yarn can be made heavy enough to take a tooth of twist, thus increasing the filling production.

Now, would it not be much better to buy half a dozen frames with suitable rings and change these frames on the work required instead of making the warp lighter and unmanageable?

I have been often laughed at by claiming that one and one-half number lighter will create a deal of trouble together with a loss of production and good stock. As I have explained to many superintendents, it is simply because the limit has been reached with the stock being run. There is no better proof than the change in conditions of the warp work. If the latter has been running fairly well for months and when it is changed a number lighter the work begins to run very badly, it should be clear that the limit has been passed, and, as stated, the only remedy is to change back as soon as possible.

Another reason why the warp yarn is made lighter is because it is demanded by the buyer. Such orders should not be taken unless there is a grade of cotton on hand that can be properly used. An order that is sure to result in a loss, should be rejected.

There are many mills, of course, running 29's yarn and finer, but not with one-inch ordinary cotton and long drafts which are often found in the spinning rooms in order to reduce the carding cost.

Some mills are running fairly well which are making 29's yarn, but the drafts throughout the mill are found very short, or, in other words, the laps are made much lighter in comparison with the yarn and the sliver. In other mills, the stock is changed instead of the drafts. How can the spinning be expected to run well, when the limit of the number of yarn has been reached and the drafts excessive. It must be understood that the writer does not advocate making 29's yarn out of one-inch ordinary cotton, even though the drafts are short. Short drafts will, of course, help some, but it will pay better to change the stock.

When the warp yarn is made lighter and the work begins to run badly, it takes a very short time before conditions become deplorable. The section hands must help out the spinners almost continually, and they must, of course, let their own work go, which only makes matters worse.

Wash, (N. H.)

"American" Cork Inset Pulleys.

Few people realize the advantages of using cork inset pulleys, especially on main drives. Belt slippage, in many cases, is not an evidence of a faulty pulley, but an indication of a too heavily loaded or greasy belt. If the load is too great, another pulley must be added to the shaft or a large pulley installed. Another remedy for this condition is found in the "American" steel split pulley fitted with cork insets. The corks, which are firmly set in the steel, are said to be practically unaffected by dust, oil, or water, and give to the pulley face an extra gripping quality.

The loss that occurs from the slipping of belts reduces the product, reaches back to the coal pile and means waste, while, on the other hand, the failure of certain machines to operate at the desired speed means loss and in some cases a defective product. In such places it is said that if cork insets are used in the pulleys, lagging, excessive belt tensions and belt dressing are unnecessary. It is interesting to note the results of extensive tests made at the Lowell Textile School and the Worcester Polytechnic Institute:

Percentage of gain of steel pulley with cork insets over same without insets, 60 per cent less belt slip.

Percentage of gain of iron pulley with cork insets over same without insets, 51 per cent less belt slip.

Percentage of gain of wood rim pulley with cork insets over plain steel without insets, 42 per cent less belt slip.

For heavy drives with cork inset pulleys and little or no belt slip, the first thing to be considered is the width of belt required to transmit the load without overstraining the belt. The face of the pulley should be suitable for belt, bearing in mind that "American" pulleys are good for all that should be put on a double leather belt of best quality. If the drive is excessive, so that the belt has to be overloaded, a special pulley had better be called for.

The American Pulley Co. have devised and patented a method of applying cork insets that does not add to the weight of the pulley. Full information may be secured on application.

Science in Sanitation.

Modern science has overcome the absence of sewage systems in the mill village. The following mills have recently installed the system of "Sanisep" sewage disposal tanks: Bibb Manufacturing Company (Porterdale Mills), Porterdale, Ga.; Covington Cotton Mills, Covington, Ga.; Clara Manufacturing Company, Gastonia, N. C.; Peek Manufacturing Company, Warrenton, N. C.; Hawthorn Spinning Mills, Clover, S. C.; Florence Mills, Forest City, N. C.; Roanoke Mills, Roanoke Rapids, N. C.; and D. W. Alderman & Sons Lumber Mills, Alcolu, S. C. Also a number of houses at the well-known summer resort, Tybee Island, Georgia. These "Sanisep" tanks are manufactured and the system installed by the Cement Products Co., 1015 Murchison Building, Wilmington, N. C.

What Causes Fly?

EDITOR COTTON:

Where does the fly come from that collects upon the outside of the flyers? As I see it, the fly comes from the last layer of roving laid on the bobbin. The face of any body moving or traveling at a high velocity will create air currents, while the back will create a certain amount of draught that can be termed vacuum, generally speaking. So when a flyer revolves, we have outward air currents and inward air currents.

For the convenience of illustration, let us assume that a feather is attached to a flyer leg, the loose end of the feather leading the leg of the flyer. The leading end of the feather will have a tendency to fly outwardly if the flyer is made to revolve in the same direction as the feather points.

On the other hand, if the feather is attached to the leg of the flyer so that the loose end of the feather will point in the opposite direction to that in which the flyer rotates, the loose end of the feather will be drawn inwardly when the flyer revolves.

From this reasoning it can be seen that the vacuum causes the fly to leave the bobbin surface, and is drawn to the legs of the flyer, when it then comes slightly under the influence of the outward air currents, which much of the fly follows, but the majority of the short cottons are prevented from doing so, owing to being struck by the legs of the flyer, and in this manner fly is collected.

This can be proven by cleaning a set of flyers, and as the bobbin fills, stop the frame when the bobbins are one-quarter, one-half and three-quarters full and examine the flyers. It will be found that the fly collects faster when the bobbins are large, the reason for this being that there is not so much vacuum between the bobbin and the flyer at the beginning of a set, owing to the bobbin revolving at its maximum speed, and besides the coils laid on the bobbin are at a greater distance from the flyer. As the bobbin fills, its speed is reduced correspondingly and the space between the surface of the bobbin and the flyer's legs is reduced, which gives the vacuum caused by the rear of the flyer leg a better opportunity to gather all loose fly.

Therefore, the smaller the flyer legs, the less air currents are created, and the less air currents there are the smaller is the amount of fly collected, which means that the short cottons will be allowed to follow the strand and form a part of the yarn, which, in turn, will result in an oozy thread, a feature much desired by all manufacturers, as it makes a smooth finished cloth. Of course, the staple being run must be considered, because some cottons will hold together better, and the loss from fly differs as the grade of cotton varies.

In order to prove that the fly collects faster when the flyer legs are large and when using a medium grade staple, clean a set of intermediate flyers and a set of slubber flyers and weigh the fly made during one set, and it will be found that although the intermediate is run for a longer time to make a set and the flyer revolves at a greater speed, a greater amount of fly will be found on the slubber flyers, which are less in number to the frame than on the intermediate. The above proves that the action of the flyer legs robs a certain number of short cottons from the surface of the bobbin.

On the other hand, when a frame is stopped in the same alley with one running full speed, it will be found that in a short time a large amount of fly will gather on all parts, which proves that a certain amount of short cottons have passed the action of the flyer legs and by the outward air currents conveyed to the mercy of the draughts existing about the room.

This question is worth much study and is creating a great amount of investigation. I know of men who are hard at work at the present time trying to invent legless flyers.

Wash. (N. H.)

Note.—Would not the larger and softer strand at the slubber tend to somewhat increase the fly at that machine over those in the later processes where the strand is smaller and contains more twist?—Editor.

Preparedness.

In the current issue of *Cotton Chats*, published monthly by the Draper Company, a new mark is illustrated, the picture of a Northrop loom centered in a circle and on the margin of the latter the words "Northrop Loom Preparedness." As an illustration of what this means, the following story is told:

"Conclusive proof of the advantage of the Northrop loom is shown in a letter just received from the treasurer of a very large cotton mill. This mill within a few years has replaced its common looms with Northrop automatic looms. The figures compare weave room production and data for a period of one week each, under average conditions before and after the change.

	Common Looms.	Northrop Looms.
Hours in week	60	54
Number of looms	6,390	5,000
Total inches of loom reed space	198,136	192,538
Average reed space per loom	31	38½
Number of weavers	775	265
Other weave room help	146	135
Total number weave room operatives.	921	400
Pounds of cloth woven	205,897	219,365

"To place the common looms on the present 54 hours per week now required by law, and produce the same number of pounds of cloth per week as the Northrop looms, would necessitate 17 per cent more common looms, and on the basis of the above figures would increase the number of weavers to 906 and the other weave room operatives to 170. The Northrop loom weaving the same number of pounds of cloth in the same time would save 77 per cent of the number of weavers and 14 per cent of the number of other weave room operatives."

Apart from its tinctorial action on the textile fibres, a decoction of logwood exercises a specific action on the density, the thickness, length, lustre and strength of the fibre. The increase in weight it causes is especially important. All these secondary reactions play a much greater part in enriching the silk fibre than they do either for wood or cotton. Raw silk possesses a marked affinity for logwood, which is about equal to its affinity for the tannins.

It is somewhat remarkable that silk, weighted with phosphate of tin, shows a much greater affinity, indeed to the extent of becoming weighted 100 per cent.

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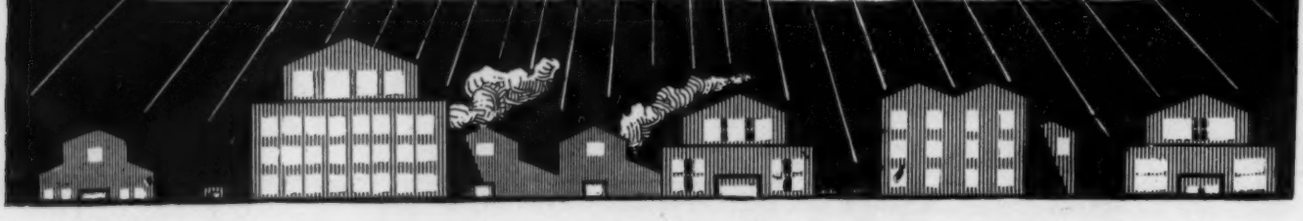

Calculations for Knitted Fabrics

BY WILLIAM DAVIS, M. A.

In the first article of this series the principles of yarn counting or numbering were disposed of and the methods of calculating relative weights and percentages for knit fabrics made from two or more classes of yarns were demonstrated. It was seen that for any combination, the exact size, price per pound and relative weights of each could be found and that these points were of great use to the knit goods manufacturer in the manifold operations of cost finding. The latter branch of the knit goods business is too often done by a clerk who has little or no technical knowledge, he can add and subtract and is versed in the principles of bookkeeping, but his knowledge usually stops at the door of the office; he has not, nor is he in many cases, expected to have further knowledge of matters which have to do with the inner systems of manufacture. It is idle to enlarge on the bankruptcies which have been brought about by defective cost accounting; how many firms float on year by year in a state of false security which one day reaches a climax, highly disagreeable to all concerned. If this branch has to be scientifically handled, then those who are entrusted with the work must forego all methods in which guesswork, even in the smallest details, is involved; they must figure out the costs with a full and accurate knowledge of manufacturing operations.

The knit goods manufacturer who does not spin his own yarns, but receives these delivered from the spinner, is often at a loss to explain differences in the articles made from lots of yarns which are supposed to be identical. The counts may be 2/20's in each case, but on receiving a new batch of yarn he finds that the goods resulting are several ounces per dozen heavier or lighter than the former samples. The usual course is to interview the knitting frame overseer and intimate that he has not been accurate in his frame adjustment; he has made the work too heavy or too light in courses per inch on the machine. The fuller or finisher is also interviewed, and he has to receive the accusation that he has failed to maintain a watchful eye on the operations, the fulling machine has been allowed too much or too little scope. Wide-awake manufacturers are now finding that the real reason for such discrepancies in the finished weight of garments is not always due to those causes, but often lies in variation of the size or thickness of the yarns delivered to him. Thus it is that the use of devices for testing the size and weight of yarns is on the increase, and the spinner cannot hope for the same scope of delivery that has been his in the past.

In this work of examination of yarns and comparison with previous samples the experienced yarn man is of the greatest advantage, for after many years' practice in handling the firm's specialties, he has the eye trained to notice differences which may prove troublesome with the new goods to be made. Reliable as this is, yet it is not entirely so, especially in the case of the thick soft spun threads with loose surface fibre which are common in many branches of the trade, the same counts of yarn often present such a divergent appearance that the most practiced eye cannot vouch for the accuracy of the delivery. There is also a great differene in yarns as they appear to the eye where the colors vary, thus yarns light in hue invariably fill the eye better and appear stouter in count than those which are darker in tone, and in such cases the verdict of the naked eye is by no means reliable, yarns may be pronounced different which are yet exactly alike in every particular of size and weight.

There are two ways in which simple apparatus for testing the counts of knitting yarns may be constructed. (A) the tests may be made by keeping a constant weight on the scales and observing the length which is required to balance this for any given count, and (B) the length tested may be fixed at a constant and the weights made to balance this length. Thus the manufacturers of Yorkshire keep to the first named method and take as the base weight the dram; to find his count he has simply to reel off the number of yards which balance this and he has the count. This is simplicity itself and can be worked by any one without knowledge of the basic principles. The weight is soldered to the scale pan and the tester, having a good idea of the approximate counts, measures off a length which comes near and so obtains a gauge of how the size actually stands, whether correct, too heavy or too light. In some other systems the length of yarn tested is kept the same, a common length being 40 yards, the counts being obtained by taking the weight of this length. The latter system is not quite so direct as the previous one and involves the use of a calculation or a table suitably prepared with parallel columns to complete the operation.

We will take an example to illustrate each method. Suppose the weight in use is the ounce or 16-dram weight, and it is required to find the number of yards of 2/32's worsted counts which will balance this weight. 2/32's = 16's single = 16 times 560 yards in 16 ounces, therefore 560 yards = 1 ounce. This gives the knitter a handy starting point for any table of this kind which he may wish to construct, for the values or lengths for all other counts can at once be deduced. The length varies directly with the count and all the others can be calculated in proportion.

Thus from the foregoing can be obtained the length of yarn in 1 ounce of 1's worsted by dividing 560 by 16 = 35 yards. Using the ounce as the standard weight, all that is required to test the accuracy of the counts is to multiply the supposed counts by 35 to obtain the number of yards, which reeled off will balance the weight. In this way we construct a table up to 10's worsted.

35	yards	in 1	ounce of	1's	worsted.
70	"	1	"	2's	"
105	"	1	"	3's	"
140	"	1	"	4's	"
175	"	1	"	5's	"
210	"	1	"	6's	"
245	"	1	"	7's	"
280	"	1	"	8's	"
315	"	1	"	9's	"
350	"	1	"	10's	"

When it comes to reeling off 350 yards of yarn to make a test of counts it becomes a question for consideration in point of waste incurred, and although the greater accuracy

is insured by greater length, still most manufacturers prefer to deal with the smaller weight, the dram or sixteenth part of an ounce being more generally in use. To make out a table for the dram, it is only necessary to divide the lengths already given by 16 when the equivalent lengths will be at once attained. For a basis of the table take 1's count again and the corresponding length for this is 35 yards divided by 16 = 2 3/16. 2 3/16 therefore can be taken as the unit for making out a table for use when the smaller weight is taken. In the case of the Yorkshire skein system, the basis is the yards of yarn in one dram so that the yarn is tested straight away by reeling off a length which corresponds to the supposed counts and weighing this against the dram weight on the scale pan. Before constructing a table for use in the worsted system, it will be instructive to make one to correspond for yarns counted on the cotton system. This should present no difficulty seeing that the standard length of hank is half as much again as that of worsted, namely, 840. To start from 2/32's counts as before this = 16's single = 16 times 840 yards in 1 pound. By division we find that this gives 840 yards of yarn in 1 ounce, and by further division by 16, the number 52½ is obtained as the yards in one dram weight. On comparison with the 35 yards previously found as the length of 1 ounce of 16's worsted, we find that by adding 50 per cent to the length given for worsted, the corresponding length for cotton is at once obtained, 35 plus 50 per cent of 35 = 35 + 17½ = 52½. From the previous table given for the coarse worsted counts we will now draw one up which will be better suited for the finer counts by using the dram as the standard weight, thus insuring that the test will be carried out with greater economy of sample yarns. At the same time in a parallel column will be given the corresponding length for similar counts of cotton yarn, obtained at once by adding 50 per cent to the worsted length as exemplified in the number just calculated.

Yarn Number.	Length in 1 dram. Worsted counts.	Length in 1 dram. cotton counts.
1's	2.18 yards	3.27 yards
2's	4.37 "	6.56 "
3's	6.56 "	10.84 "
4's	8.75 "	13.12 "
5's	10.93 "	16.40 "
10's	21.87 "	32.80 "
15's	32.80 "	49.20 "
20's	43.75 "	65.62 "
25's	54.68 "	82.00 "
30's	65.61 "	98.40 "
35's	76.54 "	114.81 "
40's	87.50 "	131.25 "
45's	98.43 "	147.65 "
50's	109.36 "	164.04 "
55's	120.29 "	180.43 "
60's	131.22 "	196.83 "
65's	142.15 "	213.225 "
70's	153.08 "	229.62 "

Sufficient has been given in the tables to show how these are made up and it will now be a simple matter for the overseer to construct his own, adapting them to any modification of systems as they may exist in his particular district. In the past these tables as published have been too often a kind of mystery, but there is absolutely no reason why they should be. When any particular yarn is delivered it is a simple matter for him to find out by trial the number of yards which will balance the dram weight and a glance at the table will show the exact counts. Thus if it were found that 43 to 44 yards of a yarn balanced the weight, it would be found from the table that the counts is equivalent to 20's worsted or 13 1/3's cotton. If 110 yards had to be reeled to balance the weight, then the table shows that the thread is of a count equivalent to 50's worsted. To find out the approximate number of yards which will do this, a general idea is to be gained by the particulars as given on the ticket. A system of trial and error has to be carried out in order to find out not only whether the yarn is up to sample, but also to ascertain what the actual count is, so as to be able to report exactly as to whether the delivery is heavy or light, and the degree of difference which exists. If in the latter example the yarn is marked to be 50's worsted, but on weighing it requires 120 yards to balance the dram weight, then from the table we can see at once that the counts which is equivalent to this number is 55's and that the yarn therefore is to the light side. If, however, about 99 yards were required then the count would be rather heavy, namely 45's counts. In the case of 30's cotton yarn from the second column it is seen that the dram weight should be balanced by 98½ yards, if the test gave 82 yards the count would be rather heavy or about 25's; if 110 yards were required the count would be given as near 34's, or several numbers too light.

The use of those and similar tables should not present much difficulty when the operator is able to obtain a sufficient length of yarn to perform the test, but unfortunately there are certain circumstances in which the manufacturer of knit goods cannot obtain as much length as he requires, many tests require to be made by unravelling yarn from the fabric, in which case he is expected to be as sparing as possible in the length extracted, as the customer may not wish to have the garment destroyed. If the length obtainable does not extend to more than a few yards, then the tables require to be extended in the direction of giving proportional lengths for weights which are fractions of a dram, but as this is a matter of quite simple arithmetic, it is not necessary to enlarge upon it here. The problem often presents itself in the case of garments which have to be exactly reproduced in regard to weight, and in such a case the calculation of the correct counts is of primary importance. The problem is almost impossible in the case of a warp-loom fabric where the threads can only be extracted in short lengths of about 1 inch or so, but in the case of the plain knitted loop the matter is rather easier to perform. In unravelling, the threads have the marks of the knitted loops very decidedly and it is advisable to straighten them somewhat before testing, the most general way being a limited application of steam, which is very efficacious. In this case, however, it is advisable to keep the yarn in a normal atmosphere over night in order to allow it to regain its normal condition as regards moisture, if tested immediately after being removed from the steaming chest it would be found that the test would show too heavy for the counts. In such cases, also, allowance requires to be made for alteration in the size or character of the thread which may be resulted in the processes of manufacture. In some examples of heavy fulling the yarn may have experienced a considerable increase in diameter from the

original. If a yarn of inferior quality made from re-manufactured materials has been used, then the yarn will show a great diminution in diameter, the scouring agent will have caused a certain amount of the yarn body to pass into the liquor in the form of invisible waste or loss in finishing.

It has baffled many to know exactly how to account for the loss of weight which goes on, especially with woollen or cotton and wool goods. The yarn seems to be robbed of its natural oils, but it would also seem that the composition of the fibre itself undergoes some modification or change. In the case of inferior yarns mentioned, much loss is due to the smaller fibres of material which are scarcely long enough to be classified as fibres, but which are included as materials. Much of it is dust and minute fragments held loosely together by the torsion of the yarn, and these take the first opportunity of parting company with the parent thread, this being afforded in a most favorable manner by the agitation and heat of the scouring bath. Thus it will be seen that in the analysis of knitted goods which have passed through devious operations in finishing, exact laws cannot be laid down, certainly the analyst requires to proceed with great care. If he can make up his mind as to the approximate nature of the finishing operations, then he will be far on the way to an accurate result, for he has then to make his allowances to correspond and add these to the size or counts found from the tables in the manner described. Many analysts find that the subject is too intricate or the factors too elusive for them to understand and they ignore altogether the matter of allowances. One ground for this is the assumption that goods in fulling usually experience some increase in thickness due to the contraction in dimensions and that this is accompanied with a loss in weight due to the effect of the scouring or fulling liquor. The increase in thickness of the yarn and its loss in body and weight are set one against the other, and the net result is, that he does not consider that an allowance is necessary under the circumstances. The question of condition of the material as regards moisture is also important, but we are afraid that in the majority of instances it is ignored by the operator. If he avoids any abnormalities in this regard perhaps he will not be far out in his estimations.

It often happens that although he has found the correct yarn counts that he has not the exact form of yarn in stock from which to execute to order and he may be unable or disinclined to obtain a quantity of the exact thread size. This problem often occurs to the knit goods manufacturer who is confronted with the fact that his yarn has gone done at the "end of the web" and that it is impracticable for him to obtain a further lot from the spinner in time to execute the delivery. The knitted fabric in this regard does not require to be so rigorously exact as is the case in the woven goods trade, but it is common in a factory for a manufacturr to finish an order with yarns which only approximate the required form. For example, a single thread may be substituted with quite good results by two singles to make up the weight, or a twofold yarn may be substituted by a single thread. Naturally it requires some care and experience to do this with impunity and the first requirement is that the overseer shall have a knowledge of the yarn sizes which he has in stock. This given, the question is which of these or which combinations of these will bring him nearest his required count.

This problem may be worked out from the rules given in the previous article in the July number of COTTON. It is known which yarn count it is desired to replace, and from an examination of the yarns in stock, it is possible to devise means of selecting from this list, taking them in two's or three's to give approximately the thread required. This problem may be carried out in the ordinary methods of calculation of yarn sizes previously explained, but a more convenient means is one which can be devised by using a weight table, where the result can be obtained more readily by a process of simple addition. The table appended is one suitable for a system of yarn testing which is carried out by having the threads wound in standard length, a favorite length for this purpose being 40 yards. By this means the standard length of 40 yards is first reeled and immediately weighed on a scale with dram weights and fractions thereof. Compared to the system of having a standard weight there is the advantage that the yarn undergoing test does not require to be tampered with and it is in general preferable to keep to the length wound instead of adding or deducting a yard which has the tendency to influence adversely the accuracy of the result. When the length of yarn is a constant, it is only a matter of weighing this to the nearest decimal place, and on examining the table the counts of the thread can at once be computed.

A start for such a table is suitably made by considering the case of 40 yards of 1's worsted counts. By the definition of the term counts we know that 1's has 1×560 yards in 16 ounces or 256 drams weight, and from this it is desired to find the weight of 40 yards by simple proportion: 560 : 40 : 256 drams : or $40 \times 256 \div 560 = 18.285$ drams.

Similarly it will be seen that the weight of a similar length of 2's worsted will be exactly half this, namely 9.142 drams, and working on this principle the whole range of counts can be speedily provided for, which when drawn out in the form of a table will obviate further calculations. To start the column for the cotton counts 1's = 840 times 1 = 840 yards in 256 drams. Then $40 \times 256 \div 840 =$ 12.195 drams. Thus we have the following table for both worsted and cotton counts:

Yarn Number.	Weight of 40 yds. Worsted counts.	Weight of 40 yds. Cotton counts.
1's	18.28 drams	12.19 drams
2's	9.14 "	6.10 "
3's	6.10 "	4.06 "
4's	4.57 "	3.05 "
5's	3.66 "	2.42 "
10's	1.83 "	1.22 "
15's	1.22 "	.81 "
20's	.91 "	.61 "
25's	.73 "	.48 "
30's	.61 "	.40 "
35's	.52 "	.35 "
40's	.45 "	.30 "
45's	.40 "	.27 "
50's	.36 "	.24 "
55's	.33 "	.22 "
60's	.30 "	.20 "
65's	.28 "	.18 "
70's	.26 "	.17 "

On comparison of this table with that previously drawn out on the basis of the constant weight, a very striking

difference will be noticeable, which is that in the first table the numbers increase with the increase of the yarn counts, whereas in this the numbers show a constant diminution. In using the second table for the testing of yarn counts, all yarns are presented to the tester in the form of a uniform hank or cut of yarn reeled to 40 yards, and this is at once transferred to the scales to be weighed in dram and fractions thereof. The table shows the figures to two decimal places, but many manufacturers prefer to have them to four or five demical places for greater accuracy, especially in the case of the finer counts. If the table has to have a more extended use in estimating the counts of folded yarns it is advisable to work out the figures to at least four decimal places so that the results may be thoroughly relied on in point of accuracy. In using this table, if, for instance, a given yarn was found to weigh for 40 yards say .6 drams, then the counts would be taken as about 30's, if the weight showed .4 drams then the counts are given in the table as 45's. For results which shall be true to one number, the differences may be calculated and the exact figure found.

A table of this kind has a special use in the case of two-fold yarns where the calculation of the folded counts for two or more threads may be found by the simple operation of addition and comparison. In the case of 50's worsted folded with 25's worsted, it is seen that 40 yards of 50's = .36 dram, and 40 yards of 25's = .73 dram. When folded the weight of 40 yards of the two together would be 1.09 drams. On referring to the table of weights it is seen that the resultant counts will lie between 15 and 20, and the difference can be found by simple proportion, thus: 15's = 1.22, 20's = 91, 1.22 minus .91 = .31. .31 therefore represents a difference of 5.

Again 1.22 minus 1.09 ÷ .13, the figure which represents the difference between the weight of the twofold counts and that of 15's count, by proportion with the foregoing it is found that if .31 = 5, then .13 will give approximately 2. This added to 15 gives 17 as the counts of the twofold yarn. As a matter of fact the exact counts as by the other method is 16.6, but this difference will at once disappear when the tables have been extended in their accuracy after the manner already indicated. In such an enlarged table, the counts would require to be drawn out in single numbers so that the exact figure would be evident at a glance instead of by the troublesome method of calculating the differences. In the case of two-fold yarns it is not much saving of time, but when the work of transferring from one counts to another is added, the advantages of the method will be obvious. Suppose, for example, it is required to find the approximate counts or 30's worsted folded with 30s cotton counts. Adding the weights found in the parallel columns, we have .61 plus .40 = 1.01 drams for the folded, and this is seen to be near equivalent to 15, and would be exactly 15's with a perfectly accurate table. Similarly it will be seen that if several such tables were constructed for the various forms of yarn counting systems in common use, calculations of this nature could be worked with simple addition of the values and comparing with the corresponding counts.

In the cost accounting department of a knit goods factory where the calculations have to be evolved from a knowledge of the average counts of yarns appearing in several denominations, the use of a table of this character may be extended indefinitely and the resourceful overseer will never be at a loss to discover fresh ways in which it may be employed with swiftness and accuracy.

The Knit Goods Market.

Although slightly less steady, the hosiery market continues strong, showing a continued abnormal demand. The unsteadiness is due wholly to nervousness among the manufacturers; and the attitude of buyers, unsettled labor conditions, scarcity of needles and unsatisfactory yarn deliveries are the chief factors.

Jobbing interests, in some quarters, are undertaking to hammer prices that were named at the opening. It would seem, almost, that there is concerted action in this direction. There is widespread insistence that merchandise be kept at a level at which the retail merchant can maintain the popular price. As increasing costs of manufacturing will not permit this, there is a demand for substitutitions or a cheapening of quality. Yet it is common knowledge that many retailers have advanced their prices.

As an instance of attempted price smashing, the experience of an Eastern Pennsylvania mill may be cited.

His quotations on a popular line is $1.15 a dozen. An important jobbing house returned the samples with a tart letter stating: "You are too high. We can get slightly better goods at 10 cents a dozen less."

The manufacturer replied in effect that it might be good business policy to buy of the mill that offered the lower price, adding, "Perhaps that mill's cost finding system is not accurate; mine is."

The mill lost what looked like a substantial order, but a day or two later had an inquiry from the same merchant on another line. Much as buyers try to disguise the fact, they want merchandise, and it would seem that, unless weak manufacturers can be frightened, they are hoping against hope of a lower market.

One merchant "feeling out" an important mill wrote, "We note a drop in the hosiery market in the last week." "I did not hear it," was this manufacturer's reply. "I expect to advance my prices."

In contrast with the firmness of hosierymen of this class is the weakness of others, a few of whom are known to be getting too little for what they are marketing.

A line of ladies' hosiery, of carded yarn, quoted at 25 cents is reported being offered by four mills for next spring delivery at prices ranging from 72½ to 80 cents, with a freight allowance of from 42 to 51 cents per case. A mill in which cost accounting receives as much attention as any detail of manufacturing or merchandising, finds that the minimum cost is approximately 71 cents, not including commissions or trade terms.

Fear that weak or not well informed mills will disturb market conditions is an element in the business that is manifest, mostly in the very quarters where firmness is lacking. Other elements are in doubt as to whether labor is not going to make delivery at current prices unprofitable.

The movement for an eight hour day is a disturbing factor, and coupled with this is the strike tendency. Threats of a severe strike in all the textile trades in Philadelphia have been heard for some weeks, and there have been annoying skirmishes.

After the Puritan Sweater Mill had been numerously

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picketed for six weeks during a strike for recognition of the union, the court, two weeks ago, granted an injunction restraining the strikers from maintaining more than one picket. This was a crushing blow to the union, whose thugs had beaten men and boys and intimidated women. Under the protection vouchsafed by the decree of the court, employees have returned to work.

Although this sweater manufacturer won, the union, two days later, closed another similar mill. No doubt is entertained that if sweater manufacturers are forced to yield, the next blow will be aimed at hosiery mills. Although once defeated, the union leaders are not dismayed, and sporadic outbreaks will occur, but textile interests feel more secure since the court has set at defiance a provision of the Clayton law as it is interpreted by unionists.

Hosiery boarders in various centers are causing trouble. Several large mills outside of Pennsylvania are having their boarding done in Philadelphia and other cities pending the return of their boarders, who are on strike, or the training of new help.

A recently developed phase of the arrogance of union boarders is their antagonism to metal hosiery forms. Many instances have been reported of union boarders purposely restricting production with the metal forms. Their average of ladies' hosiery is 65 dozens per day, against 90 dozens by boarderss friendly to the forms. In an upstate mill a woman is boarding 140 dozens of half hose a day from 18 forms, while union boarders affect to be not able to turn off more than 90 dozens.

The needle situation shows no improvement, and is especially acute so far as Standard and Wildman dial needles are concerned.

Mills substituting lisle for artificial silk for ladies' stockings to retail at 25 cents complain of slow delivery and no delivery, notwithstanding they are paying 84 cents for 2-ply 60's as against 44 cents last year. A few mills report that they are having no deliveries of yarns bought some months ago at 65 cents.

A mill making ladies' mercerized hosiery reports having substituted 60's for 70's to accommodate a jobber customer who was more interested in price than fineness and was looking out for retailers adhering to their fixed price. It is instances of this character that contribute to unnecessary fear among some manufacturers of an unsettling of the market. In contrast with the yielding shown in the case cited, a manufacturer who has advanced a line of cotton hosiery from $1.07 to $1.27 has withstood the pleas of two of the largest houses of the country for a cheapening of his production, to keep it in the 15 cent retail class. "I have built my business on merit," he says, "and I refuse to jeopardize it by lowering my standard." This is one of a great many mills which, if frightened, does not let the jobbing trade know it.

While, on the surface there is nothing to occasion the slightest alarm, and one ought perhaps to apologize for referring to it, yarn houses are reported tightening up on credits and keeping very close watch on mills about whose financial strength there can be the remotest suspician, said one well known agent for a Southern mill, "It is almost a cash basis."

The course of yarns is a puzzle to many knit goods manufacturers. Several days ago an agent quoted a price to a very large full fashion mill that wanted a day to consider. Before the day was out the agent phoned, "Our prices have been withdrawn." Instances of this character are not few, and, with labor's attitude and buyers trying to offset indifference, serve to make the hosieryman, in a superheated, sticky atmosphere, feel as though the hands of every man were turned against him.

Some few disconcerted manufacturers have yet to name prices for next year, preferring to wait and profit by the success or failure of those who opened on schedule. Such mills, however, report all the spot business they can handle, and well situated as to fall orders.

Underwear, so far as market conditions are concerned, is in a better position than hosiery. There are spots, however, where mills have felt the pinch of higher prices for labor and material.

As an instance, a mill that is behind in deliveries of orders taken in January, and which neglected to cover for yarn requirements, has been called upon to reimburse a jobber 12½ cents a dozen for 2500 dozen garments, which, the jobber avers, he bought in the open market at that much in excess of the price named in the order. Another manufacturer is held by an agent for a considerable sum representing commissions on sales of merchandise covered by an unfilled order.

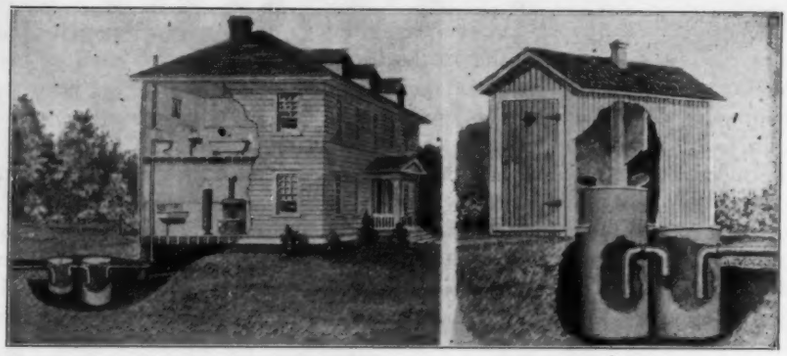
Manufacturers of woolen underwear believe their's is the most troublous branch of the trade. In the hope of obtaining united action for bettering conditions, there has been organized the Woolen Underwear Manufacturers' Association, with James H. Shine of the Hope Knitting Co., Cohoes, N. Y., as president. The association was formed and at once initiated its campaign at a meeting of knit goods manufacturers of New York and New England, arranged by the National Association of Hosiery and Underwear Manufacturers.

The name of this latter organization, it is understood, will be changed to the National Knit Goods Association if the members approve a proposed amendment to the charter.

It is interesting to contrast present merchandising conditions with those which existed almost two years ago. The reversal is complete. Jobbers who hold order confirmations are demanding delivery, and, generally, they are going to have it or know the reason why.

Mills generally which, in the slump of 1914, insisted upon acceptance of delivery are reported observing the Golden Rule and standing by their commitments. Mills that, because they oversold, are shy on delivery, will be in no position for undertaking to enforce acceptance of merchandise should there be a repetition of the flood of cancellations which poured in almost immediately following the outbreak of the European war.

There was reported to the trade, recently, an instance of a merchant's disregard for the rights of a manufacturer that ought to be brought to the attention of every mill. Special branding had been specified in an order for 50 cases of hosiery. The mill therefore had bands and labels printed from a specially made design which the merchant approved. Soon after a few cases had been delivered the order for the special branding was canceled, the merchant having been advised that he was using a registered trademark belonging to a Chicago house. As the merchant accepted the merchandise, under another form of packing, he refused to pay for the specially printed bands and labels and the manufacturer is left with them on his hands.



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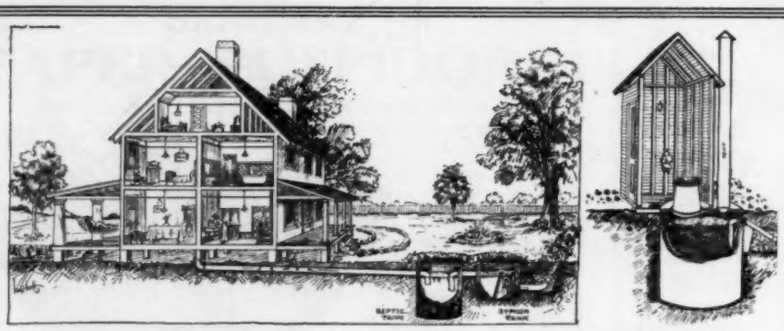

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BOSTON

Some Suggestions About Loopers.

BY "FIXER."

I have been a constant reader of COTTON for some time and I have eagerly watched the practical discussion and other departments and I notice in every issue that the overseers of spinning and carding enter into the discussions, and I can't understand why the hosiery mill men don't take part more than they do.

There are several departments a stocking has to pass through before it is ready to wear. It has to be knit, inspected, turned, looped, then turned again, hemmed, dyed, boarded and dried. Then to the press, then to be graded, folded and inspected again. Then to the stampers, then folded and put in boxes.

Foremen in all of these departments should ask through COTTON how the other man does things and tell how they do their work. The easiest and quickest way is the best. The writer has been in the hosiery mill for 18 years, but that is no reason why I know the best methods. There is hardly ever a case where two men do things alike. Some one may have a good way to keep the waste off the floor and things of this kind.

All these things save the company from loss. There is very often the case where a boss knitter has a man whom he thinks will make a good fixer, and he tries him. With the help of the boss knitter and the other fixers they will show the learner. Sometimes when a fellow has been fixing for five or six months he will begin to think he can fix as well as a man who has been fixing for 15 or 20 years. That's where he fools himself. Then he won't listen to what is told him, for he thinks he knows best. However, I have been the roads and have been fixing a long time, and I learn new things every week. I always made it a rule to pay strict attention to what I was told.

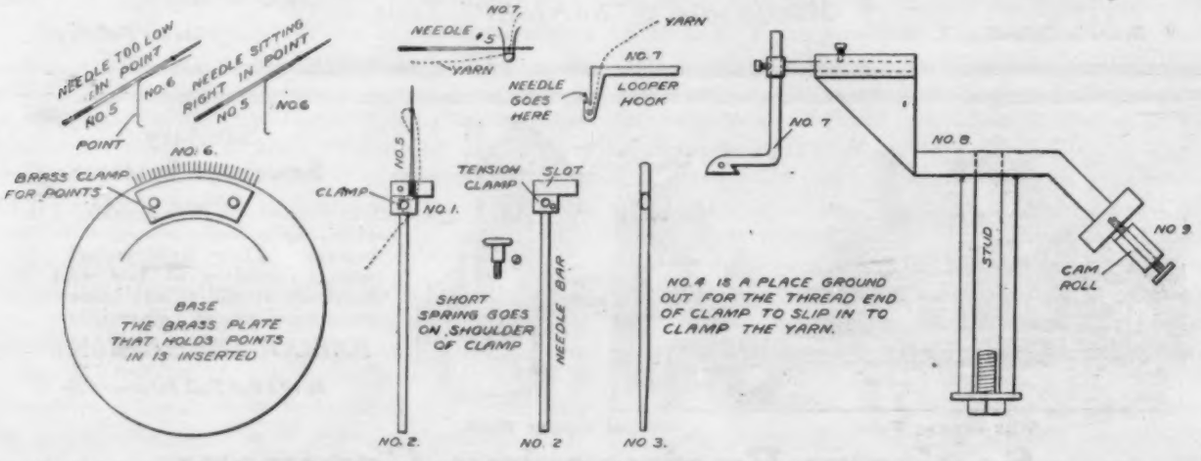
So many new fixers will hear of a job of fixing somewhere and will write for the job and possibly get it. But when the new job is secured nine out of ten will have to look for another job because they haven't the practical experience.

Every fixer and foreman can learn a lot by asking their questions and telling their experiences through COTTON.

I think it a grand thing for fixers and other knitting mill men, for hosiery machinery is very delicate and complicated. I shall take pleasure in answering any question concerning German loopers, or anything else with which I am familiar.

A few simple things may cause a looper to skip, such as lint in the tensions, or tensions too tight or too loose, or a dull pointed needle. It is well to see about tensions first, then the needle. If these in your opinion are right, than see that the stocking is free from ravel and lint. If there's little strings and lint that will be more than apt to be the cause.

I have made a careful study of this particular machine for several years and probably some fixers can get some good ideas from the accompanying sketches. Fig. 1 shows the clamp for the yarn. This clamp should be free from lint at all times, so the spring on the shoulder has its full strength, so when the needle goes into the point, 6, that the clamp tightens when it gets to the slot in 3, which is the take-up bar. The take-up bar forms the loop as shown at 5. Then 4, which is the curve cam, has brought 8 in place and then 7 the looper hook goes into the loop at 5. No. 2 is the needle bar and 7 has to be low enough so the needle goes close to 7. The hook at 6 shows a point with 5 the needle too low. That is not right, but should be set just low enough to get the stitch. The needle that is too low will spring up at the point. The needle should be run as per sketch. The hook must be low enough so that the needle can go over the thread carried by the hook. But if the needle is too low, the point of the needle will split the thread and skip. If the hook be too far away from



the needle when it's at its lowest point, the needle can't get over the thread and the hook must be as close as can be run to ward off skips. No. 9 may be worn so much that No. 4, the cam, can't put No. 7, the hook, to the proper place. The cam roll at 9 can be very easily replaced by taking the nut off bottom end of the stud shown on No. 8. But these rolls have to be fitted in the curve cam, No. 4. The end that goes down in the cam should be tapered so the machine will turn freely. These rolls have to be tempered and the writer tempers them as follows:

Heat the roll in a clean fire to a cherry red. Then dip the roll in salt water. Salt water toughens the roll and makes it last longer.

All lost motion must be out of a looper to get the best results. I have tried to make my ideas plain and if I am wrong I will thank any fixer to correct me. I have to look after 107 loopers, but, as I stated, some one else might know something different to prevent skips, and I will be glad to hear from them through COTTON.

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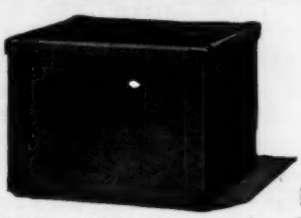

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Among the Knitting Mills.

The Lynchburg Hosiery Mills of Lynchburg, Va., will add 45 knitters, with accompanying equipment. This equipment has been purchased. It will make the plant's daily capacity 1250 dozen pairs of hose.

The Volunteer Knitting Mills, Blacksburg, S. C., have been incorporated for the knitting of hosiery, the company's capitalization being $4,000. M. H. Morrow, R. S. Cooksey and J. G. Sapooch incorporated the enterprise

The Durham (N. C.) Hosiery Mill has received an order for 318,000 pairs of hosiery costing $23,244. This hose is to be shipped from the company's High Point mill to the War Department for United States Army regulars and National Guardsmen serving on the Mexican border and in Mexico. These socks will be knit of cotton, with linen reinforcements for heels and toes. Recently the Durham company completed the contract to furnish 304,000 pairs of hosiery for the United States Navy, and J. S. Carr, Jr., the company's president, is credited with having stated that only five pairs of this shipment were rejected.

Ground has been broken for an addition to the plant of the Monarch Knitting Co., Ltd., Buffalo, N. Y., which will be 200 feet long and five stories high. This will double the space of the present mill. The new mill will be used for the manufacture of sweaters and will be of brick construction.

Incorporation has been effected by the Royal Underwear Company of Reading, Pa., with a capital stock of $10,000. The incorporators are Irvin A. Diener, Henry J. Diener, Isaac A. Deisher, H. C. Gulgrich and S. C. Hottenstein. The company specializes on a new patented closed crotch suit, known as the "Triad."

John M. Berry, president of the Rome Hosiery Mills, Rome, Ga., is an enthusiastic advocate of the situation in his own line of business and conditions at large in the South. Mr. Berry recently made the statement that in his recent trips through the South he had found merchants feeling better than in years and with prospects bright. In all of his 19 years' experience in the hosiery business Mr. Berry stated that he had never seen conditions better in that line than at present. The low end hosiery with which he is connected, Mr. Berry predicted, will become even scarcer as time goes on than it is at present.

It is reported that the Raeford (N. C.) Power & Manufacturing Co., will add 4000 spindles to its hosiery yarn mill.

R. E. Barnes and C. B. Barnes, Kittrell, N. C., are considering the establishment of a hosiery knitting mill. They want data and prices on the necessary machinery.

The Inter-State Hosiery and Finishing Mills at Burlington, N. C., will be taken over and operated by Max Lieberman, Inc., and a branch plant to be known as the Maple Crest Hosiery Mills will be established at Haw River, N. C. Men's merino and cotton hosiery and women's cotton hosiery will be manufactured, and an equipment of 70 knitting machines is contemplated. The new company has been incorporated with a capital stock of $25,000 by Mr. Lieberman, E. S. W. Dameron and John M. Coble of Burlington. It is stated that the company's plant will be driven by electricity and that there will be a daily capacity of 350 dozen pairs of hosiery. There will also be a finishing plant installed.

An addition will be built by Chalmers Knitting Company at Amsterdam, N. Y. A seven-story mill will be built, addition to connect with both ends of present plant, leaving a court in the center. Four upper stories of addition to be used for spinning yarn for company's own use, three lower floors for manufacturing the "Porosknit" underwear. A fourth story will be added to the dyehouse.

James T. Hunter is engaging in the manufacture of men's and women's cotton hosiery at 1819 Bristol street, Philadelphia, Pa., under the style of Hunter's Hosiery Mills.

H. H. Reed is to establish a knitting mill at Reading, Pa., according to report.

The Lange Knitting Mills, Chicago, Ill., recently incorporated with a capital stock of $28,000, succeeds Emil Lange Knitting Mills conducted by Lange & Shoegren, a partnership.

Arrangements have been made by the Franklin Knitting Mills to occupy an additional floor of the building on East Seventy-second Street, New York, in which their plant is located, and this will give them approximately 50,000 square feet of additional floor space. Sweaters and mufflers, etc., are manufactured, and the enlargement is being made to take care of the growing business of the company.

The Pilot Hosiery Mill Co., Durham, N. C., has been incorporated with $100,000 by W. B. Clements, J. F. Taylor, J. Henderson Stone and others. Mr. Stone is general manager, and contract has been awarded to W. H. Woods for constructing a 130 x 32-foot frame building for the mill. Forty knitters, with accompanying machinery for hosiery production, will be installed, and later a finishing plant will be added. Contracts have been awarded for the first installation of equipment.

J. W. Watts and A. E. Watts are reported to be promoting the establishment of a knitting mill at Taylorsville, N. C.

The Anderson (S. C.) Underwear Co., has been incorporated with $50,000 capital for manufacturing underwear.

The Knoxville (Tenn.) Knitting Mills Co., manufacturers of hosiery, has taken over Mascot Knitting Mills. of Sweetwater, Tenn. The latter's product, men's half hose, however, will be marketed under its own name.

The new Addison Knitting Mills Co., at Addison, N. Y., will manufacture popular priced hosiery. The company is capitalized at $10,000, and is owned by local interests. It is establishing its plant in a practically new building recently acquired.

Construction has been started on two additions to plant of the Stephenson Underwear Mills at South Bend, Ind.

The Middle Atlantic Knitting Mills, 579 Avenue C, Bayonne, N. J., have been incorporated to manufacture bathing suits, hosiery, underwear, etc., with a capital stock of $10,000.

The Armat Knitting Mills, 52 Armat street, Germantown, Philadelphia, Pa., manufacturers of seamless hosiery, which have been shut down for some time, have started up again on a line of mercerized goods.

The Broadhead Knitting Co., Broadhead, Wis., is enjoying brisk business and is working full capacity and time. The concern has recently secured a large order for sweaters from Western houses which has additionally taxed the capacity.

The Tape Drive

Our tapes are endorsed by machinery experts. They know their quality and they know their scientific structure. Exhaustive trials by practically all machinery makers have demonstrated that they have no superior. Write us.

Barber Mfg. Co., Lowell, Mass.

Spinning Tape Specialists

Last a Lifetime With no Repair Expense

THAT'S a great deal to expect from a shingle roof, but it's the very service that can be expected from **Cortright Metal Shingles.**

Over 25 years ago Cortright Shingles were placed on the market, and today many of the first Cortright Roofs laid are still in successful use.

The shingles are made of red, green or galvanized tinplate and tight coated galvanized sheets. They can be laid as easily as wood shingles. Once laid there is no patching or repairing—just a permanent roof.

Cortright Shingles are most serviceable, permanent and inexpensive. They cost no more than wood and less than slate. If you want the best roof at the least cost you should use Cortright Shingles. Let us tell you more about it in our complete book "Concerning That Roof." Ask for your copy.

CORTRIGHT METAL ROOFING CO.
Philadelphia and Chicago

JOHN D. LEWIS

Manufacturer of

Logwood Extracts & Hematine

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291 Promenade Street, PROVIDENCE. R. I
Machinery for dyeing yarns wound on parallel tubes.
Installations in Riverside and Dan River, Gibson Mfg. Co., Patterson Mills and others.

AMERICAN TEXTILE BANDING COMPANY

(Incorporated)

Hunting Park Ave. & Marshall Street

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SPINDLE TAPES and BANDS

Attention, Mr. Knitting Mill Man!

We sell needles for your German Loopers at $2.00 per hundred. Satisfaction guaranteed.
Samples sent on request.

PERFECTION NEEDLE CO., 305 Elm St., Durham, N. C.

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Such study will broaden your knowledge of the best products for your plant.

A DETERGENT THAT'S DIFFERENT
It makes a better finish

ALUMINA

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SOAPALITE

The Electric Smelting & Aluminum Co.
Sole LOCKPORT, N. Y. Mfrs.

BOOK REVIEWS

All Books Reviewed Under This Heading May Be Procured From COTTON at the Published Price.

PRINCIPLES OF ACCOUNTING. By Stephen Gilman, B. S. Bound in limp leather. 415 pages. 74 illustrations. Published by the La Salle Extension University, Chicago.

The many excellent books that have summed up this large and important subject have been useful to the mature accountant for reference, but have generally been impenetrable to the novice. In spite of laborious reading he cannot see why certain accounts should be debited on certain occasions—his perverse instinct tells him they should be credited, and nowhere can he find the mystery explained. This is simply because he has never had the fundamental conceptions of the science explained to him with the convincing clearness that only a master teacher can employ.

This adds interest to the announcement of the new book prepared by Stephen Gilman, B. S., a man who has already put the stamp of his acute mind on many departments of business and science. For several years he was manager of the credit department of the Tennessee Coal, Iron and Railroad Company, a position which involved the closest analytical study of the accounting, cost-finding, and efficiency methods of many widely divergent kinds of business. In addition, Mr. Gilman has made a distinguished position for himself as a teacher of accountants.

The new book, "Principles of Accounting," is the result of long and careful work. In addition to the exposition there are extensive illustrations based on actual practice. "Principles of Accounting" is published by LaSalle Extension University and forms a part of the material of their course in Higher Accountancy.

OFFICIAL AMERICAN TEXTILE DIRECTORY FOR 1916. Published by the Bragdon, Lord & Nagle Co., Inc., New York. Price—Standard Edition $2.00—Office Edition $3.00—Vest-Pocket Edition $1.00 per section.

The new 1916 edition of the Official American Textile Directory has been issued. This new edition contains about 300 new mills, shows about 200 mills out of business since the last edition and about 4,000 mills making changes in their reports. It contains reports of all the textile manufacturing establishments in the United States and Canada, together with the yarn trade index and a list of concerns in lines of business selling to or buying from the textile mills. is is a valuable reference work for anyone interested in textile plants.

OK-Moses Cleveland.

A distinctly new and interesting method of illustrating an old and firmly established line of products is shown in the new Oster pipe-threading booklet, "OK-Moses Cleveland." Every user of pipe-threading tools will be interested in the action photographs of machines in various kinds of plants. The book is intended for free distribution and may be obtained by writing The Oster Mfg. Co., 2068 East 61st St., Cleveland, Ohio.

A Difficult Weld.

This cut illustrates the frame of a Bulldozer Press for forming heads on 3 inch bolts at the plant of the Moran Bolt and Nut Company, at St. Louis. This frame weighs 20,000 pounds and the break occurred at the journals which receive full force of the thrust. As the strain on this part is a series of shocks or jolts, this repair is a good example of the efficiency of the oxy-acetylene welded joint. Three hundred and seventy-five pounds of cast iron filler rod was used to make this repair. This weld was made practicable by the special equipment of the Meco apparatus

with its adjustable length feature, ample capacity, and non-back-firing qualities, which made it possible for the welder to do the work in comparative comfort. Full information on this equipment may be secured by applying to the Modern Engineering Co., 14th and St. Charles streets, St. Louis, Mo.

Some Pulley Information.

Two very interesting booklets on belt pulleys have just been issued by the American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa. The first of these contains a paper by Chas. A. Brinley as read before the Engineer's Club of Philadelphia last June. It is a thirty-six page booklet, fully illustrated and containing much material of value.

The second of these booklets is a report of tests to determine the relative belt slip for different types of pulleys, by H. M. Haven and Wm. W. Crosby. This booklet contains twenty-four pages and is also fully illustrated.

Copies of one or both of these booklets may be secured without cost on application to the American Pulley Company.

Peech Sons & Phillips Co., mercerizers, Camden, N. J., on Saturday, June 17, gave an outing to their employees at Bartram's Park, N. J. In a baseball game, the quilling department defeated the mercerizing department, 3 to 2. Other outdoor sports added to the pleasure of the affair. A German band was one of the prominent features. It was voted a delightful outing by all concerned.